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Pepperdine University

Graduate School of Education and Psychology

PREPARING FOR PROFESSIONAL PROGRAMS: STRATEGIES AND PRACTICES FOR
PRE-MEDICAL EDUCATION

A dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Philosophy in Global Leadership and Change

by

April Elayne Curry

September, 2022

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ACKNOWLEDGEMENTS

To Bruce, Casey, Shannon, Taylor and Tori, thank you for your unwavering support and love. Thank you for inspiring me to be inquisitive, to love learning and to read always. You are my reason for a love for education, devotion to service and compassion for people. I am nothing without you.

Thank you to the friends and mentors that inspire and encourage me. To my dissertation committee, Dr. Madjidi, Dr. Miramontes, Dr. Brahme and Dr. Wong. Thank you for the opportunity to join the Excellence & Innovation Practices (EIP) program and I am forever grateful for your support, guidance and mentorship.

Thank you to the entire GSEP community. There were so many students, staff & faculty members that made my Pepperdine experience memorable. A special thank you to Regina Meister, Carlos Jimenez, Natasha Fitipaldi and Christie Dailo. To my cohort from Fall 2019, thank you for the opportunity to serve as your representative and for this wonderful journey. Thank you to Dr. Schneider-Ramirez and the Advisory Board community. It has been an honor to serve.

Finally, thank you to all of the students who strive to achieve their goals in spite of seemingly insurmountable obstacles. Thank you for your resilience, perseverance and grit. For this venture, you are my inspiration.

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Health Equity • Environmental Health Policy • Aging Minority Populations & Social Determinants of Health • Non-Cognitive Factors in the College Admissions Process
 • Racial & Ethnic Disparities in Women's Health • Organizational Behavior • Urban Development & Health Policy • Gender Role Perspectives Among Children • Global Leadership Competencies for Health Professions Education • Rural Community Health

ABSTRACT

This study examines the preparation process for students in professional programs and highlights strategies and practices for pre-medical education. The COVID-19 pandemic has highlighted elements of the healthcare system that explore how critical physicians are that can lead with both a global perspective and with compassionate patient care. In order to understand the competencies required for this leadership process, it is critical to consider the medical school lifecycle from the undergraduate education to residency. Working from the admissions process, we consider what competencies are required for medical school success and physician preparedness and we use that to shape a solid pre-medical education. The candidate review process that generally includes academic metrics of grade point average and MCAT score, is extended to include noncognitive factors like empathy, ethical responsibility, resilience, grit and motivation. From providing early exposure to identifying commonalities among successful medical students, it is important to align current curriculum modifications with the future physician needs. Additionally, success among medical students that completed a postbaccalaureate program or engage in premedical programs increase likelihood of success among students that otherwise would not have successfully matriculated based on research on predictive validity. As we consider preparing the next generation of healthcare professionals, it is critical to examine the competencies necessary for medical school preparedness and preparation for leading and practicing medicine in a connected world.

Keywords: student success; global health; healthcare; medical school; pre-med; postbaccalaureate programs; education; underrepresented; global; healthcare; physician shortage; public health; global leadership; healthcare leadership

Chapter 1: Introduction

Background/Historical Context

According to the American Association of Medical Colleges (AAMC), students are applying to medical school in record numbers (AAMC, 2021). As medical school admissions committees aim to complete a holistic review of each applicant, considering both cognitive and non-cognitive factors, adding additional data points to the admissions equation has helped committees identify which students are a good fit for their matriculating class. For undergraduate, graduate, and professional school admissions, *fit* and *match* have been used interchangeably to determine applicant success (Chiu, 2019; Mattern et al., 2010; P. J. Smith & Zagurski, 2013). Reviewers consider candidates' applications, assessing their coursework, writing sample, relevant activities or experiences in order to shape a well-balanced class with a strong likelihood of productive matriculation.

Background on Pre-Medical Education and the Medical School Admissions Process

The college admissions process has been analyzed considering what reviewers should look for and how students perceive institutions (Sternberg, 2010). The admissions process (Hakimov & Kübler, 2021; Rees-Jones et al., 2020; Roth & Sotomayor, 1989), assessed as “the college admissions problem” or “two-sided matching problem” (Roth & Sotomayor, 1989, p. 559), is a dual practice where “colleges have preferences over students and students have preferences over colleges” (Jiao & Tian, 2017, p. 1). Just as colleges are considering if applicants will be a good fit for their program, prospective students are weighing institution characteristics in their quest for fit considering location, environment, diversity, campus life and academics among other important factors (Hossler et al., 1999). Sternberg (2010) addressed different admissions policies and processes that attempt to understand and review applicants that are multifaceted yet, ultimately,

prioritize grade point average and standardized test scores because they are quantifiable. It is important to note that grades and standardized test scores might be prioritized because of the seemingly uniform nature of a *standard* grading system or a standard test score conversion process. For some programs, grades and scores received in coursework and on exams predict not only how students will perform in class but also on licensing exams like the National Board Dental Exam (NBDE) for dental students or the United States Medical Licensing Exam (USMLE) for medical students (Dunleavy et al., 2013; Violato et al., 2020). This perspective is critical when considering admission to professional school, especially colleges of medicine (Busche et al., 2020; Callahan et al., 2010; Donnon et al., 2007; Gauer et al., 2016).

Admissions processes are as varied as they are in number. Whether the process involves a formula developed in the interest of objective decision making or the process is based on chance in the form of a lottery (Sternberg, 2010), colleges are instructed to make decisions based on student need, achievement, the elusive fit, and sometimes the institution's bottom line. While the admissions process in professional school may have different elements from the admissions process in K-12 admissions or undergraduate admissions, and the various academic disciplines can underscore these differences, there are still some similarities across institutions. For instance, the number of slots available in the incoming class may inform the medical school admissions committee selection process (Conrad et al., 2016; Norman, 2004).

Critical factors of the admissions review process include categorizing students as in-state or out-of-state. This is a key part of the review particularly if funding or state partnerships are involved. Additionally, admissions committees may assess the candidacy of a student more favorably if the student is a graduate from a partner institution or institution where the medical school has a linkage agreement or memorandum of understanding (MOU). Committees consider

letters of recommendation from faculty from science courses and principal investigators (PI) on student research projects. Among other important factors, the personal statement or other writing sample is also considered, in addition to shadowing experience, service learning, extracurricular activities and academic achievement (Pflipsen et al., 2021).

Considering academic achievement, student standardized test scores, academic major, grades achieved both cumulatively and subject specific, for instance basic science courses, are all a part of the review process. In addition to an upwards grade trajectory in their undergraduate studies, reviewers may also consider students who buttressed their grade point average by completing graduate work or enrolling in a postbaccalaureate program. Even with the focus on academic prowess and service learning, many institutions have institutional targets driven by external and internal factors such as the board of regents, board of trustees, alumni affairs and institutional advancement. As the board of regents provides governance and supervision for public colleges and universities, the board of trustees provide stewardship and guidance as they are “tasked with fiduciary, moral, and legal responsibilities” (Barringer & Riffe, 2018, p. 155). As both groups are designed to lend structure in shaping the institutions based on the mission, their influence cannot be ignored when it comes to institutional goals and enrollment targets, particularly surrounding admissions and shaping the class. Understanding what components are reviewed by medical school admissions helps to accurately define key strategies for pre-medical preparedness.

COVID-19 and Healthcare Implications

The conversation about medical school preparation comes at a crucial time. The challenges experienced internationally by COVID-19 have been referenced as the amount of applications to medical school continue to rise (AAMC, 2021). Considered as the *Fauci effect* (Abu-Akel et al.,

2020; Cervantes, 2021), many attribute the application increase to the public platform held by Dr. Anthony Fauci, physician and infectious disease expert, and his public platform during the mitigation of the public health crisis. Millions were impacted across the globe as the physical, economic, financial, and emotional toll altered lives. Fauci's ability to manage and shed light on best health practices during the COVID-19 pandemic and his ability to garner trust are considered as indirect motivating factors for candidates considering a medical career (Cervantes, 2021).

As Cervantes (2021) indicated that the Fauci effect references Dr. Fauci's ability to gain trust, many also assert that the pandemic shed light on an appreciation for health professions and a need to increase the number of healthcare professionals (Ahmed & Carmody, 2020; Cervantes, 2021). It is projected that by the year 2032, there will be a national shortage of physicians that could amount to nearly 122,000 (Ahmed & Carmody, 2020) and while this is due in part to supply and demand, the physician distribution throughout the US is ill-equipped to handle the vast patient load.

Ahmed and Carmody (2020) highlighted strategies hospitals are employing in order to fill empty positions in addition to areas in the United States that are experiencing the greatest shortage. For instance, compared to the five states that have the fewest number of surgeons, the five states with the most have, according to Ahmed and Carmody, more than three times as many surgeons. An analysis on geographic region and healthcare access gives us additional insight on the healthcare disparity in the same state or even the same city. Ahmed and Carmody provided the example of Philadelphia, Pennsylvania, where there is not a shortage of healthcare professionals, but the number of healthcare professionals varies depending on location. Brown et al. (2016) asserted that in neighborhoods that are predominantly African American, there is a lower access to healthcare professionals.

Ahmed and Carmody (2020) also discussed the difference between doctors and physicians, asserting that while there is a physician shortage there is not a doctor shortage in the United States. Without completing a U.S. residency training program, medical school graduates cannot achieve licensure and practice medicine and serve patients in the United States because it is a requirement for graduates to achieve one year of graduate medical education in the form of residency training in order to achieve licensure as a physician (Ahmed & Carmody, 2020). While there are doctors who graduate from schools that specialize in allopathic or osteopathic medicine and there are doctors who graduate from international medical schools, the availability of residency programs prevent them from being able to receive a license to practice medicine and serve the community (Ahmed & Carmody, 2020). Strategies to increase the number of physicians include providing financial assistance to students that want to practice in specialties that are needed but may pay less, increasing the number of medical schools, particularly in underserved areas, and increasing funding for graduate medical education (Ahmed & Carmody, 2020; Lorkowski & Jugowicz, 2020).

Finally, a key facet of healthcare that COVID-19 shed light on was the need for increased telemedicine opportunities. While telemedicine was used before the pandemic because it is cost-effective and aided in the physician and specialty shortage (Kichloo et al., 2020), there are opportunities for a post COVID-19 society that were gleaned during the pandemic. In addition to the ability to increase access to quality services, other benefits include carbon emission reduction due to a decrease in patient travel and the potential for a reduction in overall spending as far as healthcare is concerned (Kichloo et al., 2020).

Global Leadership, Cultural Awareness, and Pre-Medical Education

Trust and global leadership are inextricably linked. Ezezika (2016) provided an example of the Ebola health crisis that shed light on the way community distrust was fostered because of failure of officials in the government and also in public organizations to properly respond to the Ebola outbreak. The international pandemic and public health crisis reminded many that in addition to a need for global leadership, we are more connected now than ever before. This interconnectedness means that global health is a critical piece in the training process for current physicians and has implications for the education of future physicians (Cherniak et al., 2013).

Training future physicians begins in medical school and institutions have shaped their curriculum beyond the basic and clinical skills required to include leadership, cultural competency and professionalism (Loue et al., 2015; Quince et al., 2014; Swick et al., 1999). As the emphasis is placed on the importance of students being culturally aware, international experiences such as medical mission trips and international electives are all examples of pre-medical and medical initiatives to better prepare students to lead with global health in mind (McCall & Iltis, 2014; St. Clair et al., 2017; Stoltenberg et al., 2012; Sullivan, 2018; Wallace, 2012). Special topics involve ensuring that pre-medical and medical global health experience is not voluntourism (Wallace, 2012), which occurs when medical students and health care professionals volunteer for global health initiatives in “resource poor countries” (McCall & Iltis, 2014, p. 285).

It is imperative that global health initiatives avoid the “post-colonial racialized tropes” that Sullivan (2018, p. 310) described as disregarding the capability of the health professionals in the country where the service is being provided and considering the patients in the country as “so impoverished that insufficiently trained volunteer help is better than nothing at all” (p. 310). Avoiding these global and cultural landmines is critical for a significant impact as the leadership in

global healthcare curriculum strives to teach medical students to make a meaningful and sought-after difference in the communities in which they engage.

The research emphasizes the success of institutions that seek to enlarge their global footprint by forming partnerships in lieu of imposing on the intended country (Bailey, 2013; McCall & Iltis, 2014; Umoren et al., 2012). For instance, Meharry Medical College was initially established as the Medical Department of Central Tennessee College in 1876 and was the first medical school for African Americans in the United States south. They developed a partnership with the University of Botswana Medical School, which admitted their inaugural class in 2010 (Bailey, 2013). Not only has this partnership permit collaboration but it established a medical presence in Botswana that leaves the authority and autonomy with the local physicians and trainees.

Collaboration, over imposition, is a key for global leadership. As specific characteristics of global leaders in healthcare are considered, MacPhee et al. (2013) discussed the importance of collaboration and globalization. The authors described collective leadership as shared and distributive in order to address complex challenges, providing the example of a system or hospital network that consists of institutions of research, community-based organizations (CBOs) and groups that provide healthcare all working together to deliver service to the community.

Parallels exist in examining global leadership qualities with physician competencies that will aid us in navigating strategies for pre-medical education. Critical competencies for successful physicians involve learned skills and acquired knowledge but also traits of behavior and interpersonal abilities (Jokinen, 2005). Many of the global leadership competencies align with the core competencies (AAMC, 2021) for medical students, identified by the Association for American Medical Colleges. Jokinen (2005) described the following areas:

- *Cognitive skills*: understanding of self and seeing things differently;
- *Emotional resilience*: maintaining confidence and objectivity under trying circumstances;
- *Personal drive*: being proactive and demonstrating the ability to assume risks.

The traits listed above are described with leadership competencies and accompanied by questions surrounding the appeal of a global leader which inform the purpose of the study. What makes a global leader and what is the desired skillset? Are there specific international action items, organizations, institutions that exist to support these traits and which fields are ideal for those that, as Jokinen (2005) referenced, possess global leadership competencies? Evaluating ideal traits are important but strategy lies in a system that will evaluate student outcomes with these traits and competencies that were identified early in the process (Hollenbeck & McCall, 2003).

Developing Pre-Medical Strategies Based on Medical School Requirements

Significant to the process for medical school admissions is the profile of the medical school applicant and the disposition of each candidate, including which candidates gain admission, earn a place on the waitlist, or are rejected (Corridon, 2021; Schwartzstein, 2020). As medical school admissions committees are considering students who have completed graduate work and postbaccalaureate programs as a part of their application review, students are applying directly to these programs in an attempt to strengthen their application by increasing their basic science knowledge and their science grade point average (Blakely & Broussard, 2003; S. R. Smith, 1991). Students also consider these programs for Medical College Admissions Review (MCAT) review and preparation and also as a way to express interest in a particular medical program; students often sign contracts or make pledges to only apply to the medical school offering the postbaccalaureate program (Epps, 2015). This aids the institution in allocating the number of seats

in their entering medical school class, but it also provides the student with a level of security, ensuring that if they perform well, they will earn a seat in the matriculating class.

Dienstag (2008) discussed the gaps in premedical education from a high school and medical school perspective. Many medical schools have a basic science requirement for their applicants (Core Committee, 2002; Dienstag, 2008; Emanuel, 2006). This typically consists of semesters of biochemistry, biology, chemistry and advanced mathematics (Emanuel, 2006; Poot et al., 2012). Some programs also strongly advise students to have taken an English course in addition to writing, zoology, and/or physics (Emanuel, 2006; Schwarz & Wojtczak, 2000).

While relevant perhaps for preparation on the MCAT, Dienstag (2008) argued that more time could be invested in science preparedness that correlates with the medical school curriculum, stating that courses that place emphasis on physics, mathematics and chemistry may not be related to the basics of human biology necessary for a medical school foundation. Other considerations include whether students are actually prepared with their curriculum in high school or undergraduate studies or if pre-medical programs should place more emphasis on the “the science that matters” (Dienstag, 2008, p. 221). Concerning the intersectionality of medicine and the convergence of disciplines, Dienstag (2008) indicated that an ill patient is a combination of multiple influences and the way they interact to determine diagnosis and treatment plan. This perspective supports this study’s aim to explore and identify the best combination of courses, competencies, and the key themes essential for pre-medical education.

History of Postbaccalaureate Programs

Postbaccalaureate programs are designed to strengthen student knowledge base in a particular discipline in order for effective preparation for a rigorous graduate program. Specifically, postbaccalaureate programs, special admissions (Blakely & Broussard, 2003) and

linkage programs with a pre-medical focus are designed to better prepare students for medical school acceptance (Jackson et al., 2003; McDougale et al., 2015). Important is the history of postbaccalaureate programs, especially in their efforts to recruit underrepresented students (Andriole et al., 2015; Blakely & Broussard, 2003; Hacker & Schaefer, 1988). Many of these programs surfaced in the mid-20th century specifically targeting underrepresented minorities and disadvantaged students. For instance, Wayne State University School of Medicine is considered a pioneer as the first premedical postbaccalaureate program in the United States. Established in 1969, this postbaccalaureate program aimed to enroll students that identified as African American (Blakely & Broussard, 2003; Whitten, 1999), but in 1978 the program opened its doors to students who were considered disadvantaged socioeconomically in an effort to concentrate on the diversity of the US's health care demands (Smitherman et al., 2021). University of California Irvine's 1986 implementation of their postbaccalaureate program referenced mitigating cultural differences as it related to interacting with patients (Hacker & Schaefer, 1988). The authors referenced barriers to patients trying to obtain healthcare, indicating their desire to be seen by healthcare practitioners that spoke the same language.

In 1991, the postbaccalaureate reapplicant program was founded at the University of California, Davis, School of Medicine in an attempt to admit disadvantaged students and ultimately aid them in gaining admission to medical programs but also other health professions programs including ones focused on dentistry, biomedical sciences, nursing and physician's assistant (PA) programs (Blakely & Broussard, 2003). Similar programs (Andriole et al., 2015) were established at medical schools across the country, including Southern Illinois University, Michigan State University, and The Ohio State University. These programs were established to improve the diversity of those working in the health professions, particularly in medicine.

While some schools in the mid-20th century were considering diversity and establishing linkage programs, there is significant history considering medicine and race that must be addressed. Even though medical schools like Meharry Medical College and Howard University College of Medicine were founded in the late 19th century to provide educational opportunities for African Americans, there was still great disparity for the physicians aiming to earn medical degrees and for black patients in the United States (Alsan & Wanamaker, 2018; Crenner, 2012; Savitt, 2006; Skloot, 2017). From segregated “whites only” hospitals to issues of theft and compensation (Skloot, 2017) to discriminatory and tortuous practices like the Tuskegee syphilis experiment, which purposefully did not treat African American men in Alabama for syphilis, so the effects of the disease could be studied (Crenner, 2012), trust is still a major issue for many people of color. Baker et al. (2008) discussed a meeting of the American Medical Association (AMA) where an integrated medical society and a segregated medical society both attempted to attend the meeting. The integrated group was purposefully excluded from the meeting and essentially barred from attending. This session held a critical vote that ultimately accepted segregation forcing black physicians to establish their own organizations (Baker et al., 2008). Although the AMA meeting occurred in 1871, racist practices like this continued through the 19th and 20th century, highlighting a stark contrast from the *separate organizations* that were created because of racism and the desire for some schools to create postbaccalaureate programs to increase diversity (Alsan & Wanamaker, 2018; Crenner, 2012; Savitt, 2006).

Statement of the Problem

Medical school admissions and the matriculation process is becoming increasingly competitive and the level of student preparation has an impact on their ability to perform on shelf exams and courses (Dowd et al., 2021; Epps, 2015). Research exists on programs and initiatives

that provide additional resources to disadvantaged and/or underrepresented students (Blakely & Broussard, 2003; Epps, 2015; Hacker & Schafer, 1988; Jackson et al., 2003; McDougle et al., 2015; Riyad, 2019), but correlations are not thoroughly considered for positive performance on licensing examinations and coursework. There are students who are seemingly unprepared, admitted based on non-cognitive factors, and experience great success on the United States Medical Licensing Examinations (USMLE) and ultimately match at some of the best residency programs in the country. Against the notion of predictive validity of the MCAT that indicates MCAT performance implies medical school success (Dunleavy et al., 2013; Violato et al., 2020), these students excel in medical school. It is imperative to identify the qualities of successful applicants and matriculants, particularly those that matriculated to medical school from a waitlist or through a specialized postbaccalaureate program that were not as competitive. Identifying the qualities this population possess is important as this will shape the pre-medical curriculum and shed light on key factors for student success.

Additionally, there are implications that for students who are not prepared, they may enroll in a postbaccalaureate program because of limitations in their pre-medical education; support for mitigating these limitations include undergraduate studies, summer programs, and other partnerships (Dienstag, 2008; Palmero & Bauckman, 2021; Zhou et al., 2021). How are colleges and universities preparing students and does this correlate with what students face when they get to medical school? Preparedness for medical school has a direct effect on the time it takes to graduate from medical school, which effects the timeline to achieve residency and ultimately practice medicine. Identifying critical factors that students can learn before or during a postbaccalaureate program will prevent loan indebtedness (Watson, 2021) for medical students in addition to

defining a clear pathway to graduation, residency placement and licensure (Coumarbatch et al., 2010).

Purpose Statement

The purpose of this study is to examine the knowledge required of incoming students, based on medical school admissions trends and best practices, and to consider how and if pre-medical preparation, including postbaccalaureate programs or other pre-professional programs, can fill in the gap in preparing students for medical school. As there are more programs that are geared towards disadvantaged and/or underserved students, it is critical to consider the history behind what made these groups underserved and/or disadvantaged. Examining the scope of pre-medical preparedness, from high school to summer programs to graduate programs, will shed light on consistencies and areas for improvement as the study considers the key elements necessary for successful medical students.

Students begin medical school with varying levels of preparedness (Miles et al., 2017; Shankar et al., 2013). Serving as a guiding light for studies on predictive validity and the MCAT, which use MCAT score to predict medical school performance, this research examines other factors aside from the MCAT that contribute to medical student success. There are students annually who are faced with the unfortunate dismissal from medical school or have to decelerate, repeating a year of medical school that they have already taken. Finally, there are students that are considered average in medical school, regardless of how they performed previously. These students may struggle with medical school content but eventually successfully graduate. This study seeks to explore key factors of the medical school curriculum among students initially labeled below profile upon entry that turn out to be successful medical school students and graduate. Considering these similarities will have far-reaching effects, providing strategy and direction to

enrollment management departments, admissions committees, academic affairs offices and student affairs divisions, allowing them to make sound decisions on candidates and providing them with the tools to support current medical school students as they matriculate through the curriculum.

Research Questions

As we consider pre-medical education broadly and post-baccalaureate/pre-medical programs specifically, the following research questions (RQ) were addressed in this study:

- What are the critical skills, core competencies and training necessary for a pre-professional education that will lead to successful medical school matriculation?
- Can these critical skills, core competencies and training be incorporated in a theoretical framework that supports pre-professional education for medical school?

Significance of the Study

This study will expand the medical college admissions process and place emphasis on new factors, increasing the use of additional data points to highlight student abilities from a holistic perspective. Special attention will be directed towards the abilities of students that may not initially meet presumed criteria, creating a new list of recommendations for skills and competencies necessary for pre-medical education and successful medical school matriculation. It will also provide a framework for postbaccalaureate programs and undergraduate premedical academic programs, organizations or pre-professional programs to consider implementing in their curriculum. From incorporating humanities or elements of a liberal arts education (Wachtler et al., 2006) to mandatory international electives (Cherniak et al., 2013), this study will chart a path forward. Special attention will be paid to underrepresented groups in medicine, including but not limited to students from rural areas, students that identify as female, students that are members of

the LGBTQ+ community and students that identify as Black/African American, Native American, and/or Latinx.

Characteristics of students who matriculated to medical school will be considered, assessing students that met the presupposed criteria, students that exceeded the requirements and those that fell significantly below the profile. Considerations for pre-medical coursework taken and MCAT preparatory programs or resources, in addition to non-cognitive factors like motivation, resilience, perseverance, empathy, critical thinking and compassion.

Research on the predictive validity of MCAT score (Dunleavy et al., 2013; Gauer et al., 2016) implies that Step 1 passage rate and the subsequent Step 2 and Step 3 exams can affect which residency program will consider the student for match (Gauer & Jackson, 2019) and how the student will perform once in residency (Gauer & Jackson, 2019). This study aims to speak to this predictive validity research outlining protective factors that lead to medical student success. Mitigating any lack of preparedness early in the student's health professions career will be beneficial both to the student and the institution.

Assumptions of the Study

The study involves students who are below the academic profile of an admissible student who intends to enroll in a postbaccalaureate program before applying to medical school. It is assumed that the students who enrolled in the postbaccalaureate program were below profile students based on their MCAT, GPA, or both. The study assumes a connection between being well prepared for medical school and completion of a postbaccalaureate program, not accounting for students who may successfully complete a postbaccalaureate program but not demonstrate preparedness for medical school. This study employs a survey to ask students about strengths of their program and also asks them about gaps. The survey asks students who graduated from a

postbaccalaureate program and who successfully completed their first year of medical school about the differences about the postbaccalaureate coursework compared to their undergraduate institution's pre-medical coursework. The study assumes that students will answer the questions asked of them honestly and the study assumes that the students that acknowledge the consent form and other required IRB documents are being honest about their responses.

Limitations of the Study

A limitation of this study is that we are including students who attend medical school in the southeast and attended a postbaccalaureate program in the southeast after undergraduate studies. The age group and demography of the medical students are also both critical factors. Students selected for this study are over the age of 18 and identify as underrepresented in medicine. These students are at a stage of the medical student lifecycle between undergraduate medical education and graduate medical education. They are either enrolled at an accredited medical school, according to the Liaison Committee on Medical Education (LCME), or they are enrolled in a residency program at a hospital.

Students who are identified as underrepresented in medicine are a part of the following groups: Black/African American, Native American, and/or Latinx. There are some medical programs and some medical specialties that would also consider gender as an area that qualifies as underrepresented, especially with students who consider themselves non-conforming, non-binary, cisgender female, and/or transgender. While preferred gender pronouns are included on the AAMC medical school application (AAMC, 2021), it is important to note that these terms to define underrepresented groups are not terms used by AAMC for students to "self-select" on their applications. For example, students cannot select Latinx, but Hispanic and/or Latino are the choices available.

Definition of Terms

Association of American Medical Colleges (AAMC): a non-profit organization dedicated to “improving health through the advancement of academic medicine (AAMC, 2021, p. 1).” The AAMC administers the MCAT and residency match program (ERAS, NRMP, and SOAP) and represents U. S. and Canadian medical schools, health systems, and teaching hospitals (AAMC, 2021).

Pre-Medical Education: traditionally known as high school, undergraduate or graduate studies before medical school, this can also relate to individual courses, postbaccalaureate programs, special summer or intensive programs and immersion experiences. For medical education, this could be described as advanced coursework in molecular biology, cellular biology, genetics, science and mathematics (Dienstag, 2008).

Predictive Validity: considers if test scores on a particular assessment relate to performance on a future test or assessment (Frey, 2018). In medical school education, indicates that scores on the MCAT will estimate student scores on future exams like the United States Medical Licensing Examination (USMLE) Step Exams (Dunleavy et al., 2013).

Medical College Admissions Test (MCAT): test used by some medical schools to make an assessment on applicants:

developed and administered by the AAMC, [it] is a standardized, multiple choice examination created to help medical school admissions offices assess your problem solving, critical thinking, and knowledge of natural, behavioral, and social science concepts and principles prerequisite to the study of medicine. (AAMC, 2001)

National Residency Match Program (NRMP): an organization that organizes the process that matches medical students to residency positions in the United States using a system that is meant to result in an ideal outcome for both the medical student and the residency program (Claus et al., 2021)

Electronic Residency Application Service (ERAS): an application-hosting site that provides centralization for applicants to pursue medical training through residency programs (AAMC, 2001).

Supplemental Offer and Acceptance Program (SOAP): the process for medical students to gain unfilled residency positions if they did not match in the Main Residency Match (Ritchey et al., 2020)

Bias: a perspective on a person or group, especially based on race, gender, culture, ethnicity, or nationality, where assumptions and assessments are made (Van Ryn et al., 2015; Williams & Wyatt, 2015)

Curriculum: “a course or track to be followed” often at a system of education like a school, institution or classroom (Van den Akker, 2004, p. 37); a “blueprint for achieving restricted objectives in a school setting and the evaluation of their achievement” (Egan, 1978, p. 65).

Holistic Review Process: a personalized consideration of a candidate’s application that assesses academic achievement, standardized test and application materials in addition to writing ability, special skills, unique characteristics, personal story and other critical factors (Witzburg & Sondheimer, 2013)

Clerkship: training through medical rotation designed to provide medical students with exposure to different fields or specialties in medicine, such as psychiatry, internal medicine, surgery, pediatrics or neurology (Röcker et al., 2021).

Postbaccalaureate Program: a program that is “traditionally designed to mold students into more competitive medical school applicants and attract and recruit students from many different backgrounds” (Epps, 2015, p. 8). Epps (2015) stated that postbaccalaureate programs may aid student interested in enhancing their academics and/or students interested in changing careers but

also are categorized as “special master’s programs, programs designed for economically and/or educationally disadvantaged students, and programs designed for groups underrepresented in the field of medicine and health sciences research” (p. 9). For the purpose of this study, postbaccalaureate considers any medical school coursework taken before medical school entry.

Cultural Competency: the respect and understanding of other cultures, beliefs and points of view and using these competencies in healthcare and in providing quality healthcare to diverse populations (Loue et al., 2015; Quince et al., 2014; Swick et al., 1999).

Core Competencies for Medical School: ideal traits for students entering medical school that encompass interpersonal traits like social skills and teamwork, intrapersonal traits like ethical responsibility to self and others, thinking and reasoning traits like written communication and science traits like living systems (AAMC, 2012).

Multiple Mini Interview (MMI): a process of conducting interviews where candidates rotate through short stations and asked judgement questions based on a situation or scenario. The Multiple Mini Interview is used by medical schools in addition to or in lieu of the traditional interview in order to “assess different non-cognitive attributes” (Lemay et al., 2007).

USMLE (United States Medical Licensing Examination): a national assessment serviced by the Federation of State Medical Boards (FSMB) and the National Board of Medical Examiners (NBME) that provides tests required for medical school matriculation and for graduates to become licensed physicians (Dunleavy et al., 2013).

Underrepresented: to be smaller in number or percentage; usually used to refer groups of individuals that identify as a particular gender, race, ethnic group, or associate with a country of origin and are lower in terms of percentage when considering the larger group within in a particular field of study or discipline (Epps, 2015).

Non-cognitive factors: skills that are not intellectual or analytical but consist of characteristics that involve motivation and are interpersonal (Rose & Parfitt, 2010); traits include empathy, compassion, critical thinking, and resilience.

Fit: the alignment of a potential candidate with the vision and mission of the admitting institution; used by admissions committees and enrollment managers to assess compatibility (Chiu, 2019; Mattern et al., 2010; P. J. Smith & Zagurski, 2013).

Admissions Committee: consists of non-voting and voting members, sanctioned by the Dean, Faculty Council and/or other administrative leadership to review and make decisions on potential candidates for an institutions specific academic program (Goldwag, et al., 2020)

LCME (Liaison Committee on Medical Education): an accrediting body that governs US and Canadian medical schools on everything from the structure of the medical school admissions process to a medical schools operating policies and procedures (Kendall, 2020)

Chapter Summary

How students learn and what is needed of physicians are both critical for outlining the ideal pre-medical and medical school curriculum. Ensuring that the correct science foundation is accurately provided is just as important as ensuring that students learn to respect and understand different cultures and perspectives (Swick et al., 1999; Walsh, 2015). The solid foundation established from a pre-medical education prepares students for a seamless transition to medical school. Summer programs and postbaccalaureate programs are efficient ways to strengthen student applications to medical school and better prepare students, particularly those that may not have been familiar with medicine or pursuing a career in health professions. Proving these students with exposure through enrichment programs that do not require an academic grade point average gives them a low-risk way of learning topics in medical education. Teaching students about how to

highlight their strengths in the medical school application process teaches them about the holistic review process. When students learn to draw from their strengths, this instills confidence and security in their abilities.

The international pandemic placed health professionals and healthcare providers at the forefront, drawing attention to the sacrifice and skillset needed to care for the most vulnerable. COVID-19 exposed inequities in healthcare systems, vaccine distribution and highlighted the existing national and international health disparities, proving that global leadership competencies are critical for medical education (Jokinen, 2005).

According to the AAMC (2021), the number of medical schools that are providing international elective courses has significantly increased. These international electives give students the opportunities to explore other cultures and learn how healthcare is provided in other parts of the globe (McCall & Iltis, 2014; Stoltenberg et al., 2012). Assessing the ways that medical education is provided currently, exploring strengths and shortcomings, will shed light on the need for a comprehensive model based on the latest knowledge and expert advice. Drawing from the research on collaboration, this model for medical education will be rooted in critical components that will ultimately lead to student success and supporting patients as the world becomes more global and global competencies for leadership are needed.

Chapter 2: Literature Review

Introduction

In this chapter, a review of the literature is presented related to medical school education, the composition and selection of a medical school admissions committee, and the importance of pre-medical preparation (Hakimov & Kübler, 2021; Rees-Jones et al., 2020; Roth & Sotomayor, 1989). Historical implications of the evolving medical school curriculum are discussed in addition to emerging themes in medicine, particularly with reference to the role of institutions that focus primarily on social mission (Grbic et al., 2013; Mullan et al., 2010; Mullan, 2017). Key issues related to mission, vision and the way mission statements are communicated in organizations is examined considering leadership, management and transforming organizations (Fairhurst et al., 1997; Kotter, 2007; Senge, 2006). A close exploration of mission statements from organizations, institutions of higher education and finally, an examination of medical school mission statements is presented (Campbell, 1997; Davis et al., 2007; Morpew & Hartley, 2006; Pearce & David, 1987; Stemler & Bebell, 1999). The connection between medical school mission statements and learning outcomes of the student population examine if these institutions are prepared to address the health care requirements and needs of the country (Ahmed & Carmody, 2020; Cervantes, 2021).

Contemplating the interconnectedness of global medicine, additional considerations surround the ability of medical schools to prepare students for global leadership and providing care across borders (St. Clair et al., 2017; Stoltenberg et al., 2012; Wallace, 2012). The importance of cultural competency and producing physicians who can that can care for diverse populations (McCall & Iltis, 2014; Sullivan, 2018) with compassion is emphasized in addition to global implications of the medical school curriculum and COVID-19 (Cervantes, 2021; Puljak et al., 2020; Shahrivini et al., 2021).

The difference between various enrichment programs and traditional postbaccalaureate programs are examined in addition to any implications for disadvantaged and/or underrepresented groups in medicine (Blakely & Broussard, 2003; Epps, 2015). Also examined are challenges that underrepresented minorities, including women and girls, face from barriers experienced during secondary education through medical school and residency, with special attention paid to gender discrimination in medical school and healthcare. Considering other areas of underrepresented groups, literature that references physicians who identify as Native American, Latinx and/or Black or African American is discussed in addition to the social implications of health, health disparities, and history of institutionalized racism and bias (Alsan & Wanamaker, 2018; Crenner, 2012; Miranda & Sanchez, 2014; Nix, 2017; Park, 2017; Savitt, 2006). A survey is conducted of pre-medical programs for students that require additional academic support, due to MCAT score, grade point average or limited exposure to the natural sciences, including but not limited to summer enrichment opportunities, undergraduate societies or associations and post-baccalaureate programs. Finally, issues of risk and resilience based on students who, based on predictive validity and the MCAT, were not expected to perform well on the first year of medical school but were ultimately successful are examined, paying close attention to protective factors that led to their achievement (Blalock et al., 2015; Jumat et al., 2020; Keyes, 2005; Kleiman et al., 2013; Majeed et al., 2019; Marie et al., 2019).

History of Medical School Education: Implications for Educating a Diverse Student

Population

The literature surrounding medical school education content and curriculum is as varied as medical schools are in number. A discussion of traditional medical education cannot be discussed

without considering the history of healthcare in the US and how it shaped academic health science centers, particularly its implications for the education of diverse student populations.

The *Flexnerian revolution* began in 1910 with the Flexner Report, a document produced by Abraham Flexner that resulted in the reform of medical education (Flexner, 1910; Padilla & Bell, 2018; Savitt, 2006; Tauber, 1992). Flexner's report on medical education in Canada and the United States, produced from a biased and what some considered unfair review of medical schools, shaped the way medical education was delivered. Before Flexner, the chair of the Council on Medical Education of the American Medical Association (AMA), Arthur Bevan, had already criticized institutions that taught older techniques and offered classes taken in the evening, indirectly referencing Howard University's medical department as evening program courses were still in demand (Savitt, 2006). Additionally, Flexner's criticism surrounded his belief in medical schools being "university-based, for faculty to be engaged in original research, and for students to participate in 'active' learning through laboratory study and real clinical work" (Ludmerer, 1999, p. xxii). Bevan was critical of institutions that taught the "techniques of a former era" (Savitt, 2006, p. 1417). This was unfairly targeting historically black college and university (HBCU) medical schools as the majority of their faculty, most of whom were black, had recently graduated from medical school and thus, had limited experience and "because of race restrictions had not attended postgraduate courses" (Savitt, 2006, p. 1417). Savitt (2006) described the medical education at the majority of medical schools: "Faculty at black proprietary schools consisted primarily of their own graduates, some just a year or two out of school" (p. 1417).

Flexner's contributions made assessments on medical schools in the United States and Canada at the beginning of the 20th century (Barzansky & Gevitz, 1992; Duffy, 2011; Savitt, 2006). Flexner's two-part report referenced the condition of medical education in 1910, the ideal

curriculum for medical education, and made recommendations for its reconstruction (Flexner, 1910). Mullan (2017) referenced Flexner's 20th century contributions to medical education as he emphasized the "scientific environment" (p. 123) as the ideal space for learning over the "for-profit proprietary medical schools" with "low admission standards, poor laboratory facilities, and minimal exposure to clinical material" (Duffy, 2011, p. 272). Flexner (1910) considered elements such as standards for admission, the quality of the training facilities, and if instruction was provided by physician scientists in laboratories that were well-resourced. Mullan (2017) made it clear that while Flexner shaped early medical education, there were views that discussed Flexner's limitations as far as growing knowledge in biomedical research, social concerns and community health issues, in addition to his bias against medical education for women, historically black medical schools, and black physicians (Barzansky & Gevitz, 1992; Drake, 2014; Duffy, 2011; Flexner, 1910; Mullan, 2017; Savitt, 2006).

Flexner dedicated two chapters in part one of his report to an analysis of medical education of women and "the Negro" (Flexner, 1910, p. iii). Concerning women's medical education, Flexner (1910) criticized women's medical colleges asserting that they were inadequate and could not be improved without great cost. He stated that the increasing opportunities for women to enter the medical profession did not have an effect on the numbers that enrolled, indicating that as opportunities increased, fewer women attended medical school and fewer women graduated. Flexner's assertions did not consider the cause of women's rights during the time period or that the societal roles at the time meant that women were often relegated to domestic or household managerial duties (Des Jardins, 2003; Talbot, 1910). Barriers for women in medical education still exist in present day (Arrizabalaga et al., 2014; Halperin et al., 2010) so Walsh's (1977) work, which in its title indicated that there was a need for doctors but women should not

apply, captures the essence of some of the challenges women faced (Patterson, 2012; Wietsma, 2014).

As Savitt (2006) explained, where the medical education of women may have been referenced in an “occasional article” (p. 1418) by the Council on Medical Education of the AMA with Flexner as chair, black medical schools did not receive any acknowledgement in any “annual reports, articles, and commentaries” except for the “the word ‘colored’ posted next to their names in tables, and one-sentence statements when one of them received a gift, completed a building or closed” (p. 1418). While Barzansky and Gevitz (1992) and Savitt (2006) indicated that Flexner’s report was the first time African American medical schools had been acknowledged by organized medicine,,Flexner’s remarks had far-reaching effects on the early medical school educational opportunities for underrepresented minorities, specifically for black doctors and physicians of African descent.

Flexner’s report maligned many by including disparaging remarks about African American physicians and all black medical schools except for Howard University and Meharry Medical College (Savitt, 2006). Flexner (1910) started his chapter on the “Negro” and medical education stating that the latter was the source of disease and infections that would contaminate those that identified as white. He indicated that education for blacks should be focused on hygiene instead of surgery and that the mission should focus on civilizing, sanitizing and serving black people. Flexner ended the chapter on a review of the black medical schools that were open at the time, insisting that the only black medical schools that were worth saving and developing were Howard and Meharry.

Flexner portrayed medical education for African Americans as deficient, defining roles that were limited for African American physicians, hinting that “black physicians possessed less

potential and ability than their white counterparts” (Savitt, 2006, p. 1419). Woods-Burnham et al. (2021) indicated that Flexner’s report was a proponent of the “germ theory” which positioned blacks as a threat to the health of whites. Savitt (2006) described the opportunities for an African American student interested in medical school in the early 1900s was limited to 10 schools, which included Meharry Medical College in Nashville, Tennessee; Howard University Medical Department in Washington, DC; Louisville National Medical College in Louisville, Kentucky; and Leonard Medical School of Shaw University in Raleigh, North Carolina. Before 1920, only three, including University of West Tennessee College of Medicine and Surgery, were in operation (Savitt, 2006). Presently, Meharry Medical College and Howard University College of Medicine are the only ones remaining from the original list.

Flexner’s recommendations to the field of academic medicine (Barzansky & Gevitz, 1992; Drake, 2014; Duffy, 2011; Mullan, 2017; Savitt, 2006) had far reaching effects on the number of minorities that were unable to matriculate. Projections were made considering the dearth of minorities in medicine, forecasting the number of black students who could have ultimately graduated from one of the HBCU medical schools that closed due to the Flexner report (Campbell et al., 2020). Research indicates that only considering the year 2019, of the 13 HBCU medical schools that closed due to the Flexner report there could have been a 29% increase in the number of contemporary graduates, addressing the physician shortage and health professions diversity (Campbell et al., 2020; Mullan, 2017; Savitt, 2006).

In addition to the Flexner report, Drake (2014) discussed the changes that took place at the end of the 20th century as clinical experiences were added to the medical school curriculum and there was rising interest in combining the basic science and clinical years of medical school. Similarly, Mullan (2017) also mentioned that while effective in establishing standards for their

instructors and facilities, Flexner's plan did not shed light on inequities in healthcare within society or the role of academic health science centers in mitigating these inequities. Many believed that the limitations in the body of work from someone so influential is the reason for "marginalization of social mission in health profession education" (Mullan, 2017, p. 123). Ludmerer (1999) asserted that Flexner's model began a relationship with American medical schools and its mission to educate, conduct research, and provide patient care. Considering both education and research, education dominated the time frame between the first World War and the second and research was a principal objective between the end of World War II and 1965 and post 1965, a time frame considered the "clinical era" (Ludmerer, 1999, p. xxii). The 20th century reflected a transition in healthcare and medical education. From growing medical schools to the approval of Medicare and Medicaid, there were challenges between what was beneficial for the patients, the medical students, the faculty, and sometimes the institution itself (Ludmerer, 1999; Mullan, 2017).

Between requirements of maintaining the hospital in the academic health science center, which typically centered around patient needs and office visits to the demands of the institution at the academic health science center, which required the faculty to spend less time seeing patients and more time teaching students, the balance was often amiss (Ludmerer 1999). Hafferty et al. (2019) referenced the variability of medical institutions, indicating that location and mission are just a few of the elements that make each institution unique.

Schools have considered various models for curriculum development that align with their institution's mission, graduation outcomes, faculty research interests, and teaching expertise; even still, the curriculum changes are perceived differently by faculty, staff, and students (Chen et al., 2019; Muller et al., 2008). This includes schools that have developed models that are integrated (Muller et al., 2008), problem based, and examining content overall (Chen et al., 2019). Important

conversations involve the relationship between teaching and research (Walsh, 2015) and medical school curriculum design outcomes on student success (Prideaux, 2003); medical school curriculum changes, including implementing technology, classroom activities that are facilitated by the professor have led to increased student engagement and performance (Morgan et al., 2015; Petit et al., 2017; Street et al., 2015)

Several sources (De Cates et al., 2019; Elam et al., 2002; Prideaux, 2003; Valsangkar et al., 2014) have indicated that the composition of the medical school curriculum, including mission and vision, has implications for the scope of healthcare in the United States. This perspective draws a connection between the healthcare services provided and the people in “the communities in which the students will serve” (Prideaux, 2003, p. 268), emphasizing the importance of the commitment medical institutions have to ensuring students are equipped with the tools to serve. Such a toolkit (Averill et al., 2007; Elam et al., 2002; Elam et al., 2003; Olney et al., 2006) would include exposure to “experiential service learning electives” (Elam et al., 2003, p. 194) and other opportunities that the literature confirms leads to more adept healthcare professionals who embrace social responsibility and are patient focused (Elam et al., 2003). In some arena’s, curriculum design has an impact on student perception of various specialties including primary care, specialties that include internal medicine, family medicine and pediatrics (Morley et al., 2015) and psychiatry (De Cates et al., 2019). While used broadly to describe premedical programs for medical school hopefuls through the postgraduate training for physicians to maintain their careers, medical school education prepares students to provide healthcare services based on the need of the populations they serve (Swanwick et al., 2018).

Social Mission of Medical School Education: Underrepresented Minorities and HBCU

Medical Schools

Medical schools also have various focus areas that may involve research, medical specialty, and social mission. This can have an impact on the admissions process and how the admissions committee identifies which students to interview and ultimately select for the matriculating class (Ellaway et al., 2018a; Evans et al., 2020). Mullan et al. (2010) considered how social mission compares to other elements of medical education and shed light on the definition of medical schools' social mission based on the number of physicians who choose to work in areas that are considered underserved and the number of physicians who select to practice primary care (Mullan et al., 2010; Mullan, 2017). Mullan (2017) described social mission as the alignment of the institution to eradicating and eliminating health disparities through programs and overall performance of those that represent the institution.

There is an emphasis placed on equity and eliminating health disparities which is echoed by Morley et al. (2015) in their assertion that accountability for producing a physician workforce that is dedicated to improving healthcare should fall on medical schools. The authors indicate that through primary care this can be done by a commitment to serving communities that are considered rural or of low socioeconomic status. Mullan (2017) indicated that in addition to other areas of lack, there are many places in the United States that are without healthcare access, including access to both healthcare coverage and healthcare professionals. This aligns with Morley et al.'s (2015) research that indicated medical schools that have mission statements that involve social mission are more likely to produce physicians that choose to work in both primary care specialties and in underserved communities.

The emphasis on social mission at a medical institution directly affects the experience of its students (Ellaway et al., 2018a). Ellaway et al. (2018a) differentiated between the aspects that define social mission of equal access to healthcare, physician's serving in particular communities, indicating an emphasis on putting the principles of social mission into practice.

Opportunities for institution to practice social mission, or as Ellaway et al. (2018b) asserted "externalize" in medical education, involve a community service component within the curriculum, a track or specialization that is community based, a clerkship or rotation in an environment that has a large volume of "vulnerable" members, special interest groups and electives in international health (p. 175). In Ellaway et al. (2018b) 's exploration of medical schools from seven different countries, including Australia, Canada, Belgium, the Philippines, South African, Sudan and the United States, there is a universal appeal for "how they translated their missions to their undergraduate medical education programmes and how students in those programmes perceived the mission" (p. 179).

There is variation in terms of the types of institutions that indicate social mission is an important factor (Morley, et al., 2015; Mullan, 2017). Schools that are not in the northeastern region of the United States, state schools, and medical schools that were not in urban environments ranked higher in social mission, while private institutions and institutions that received National Institutes of Health (NIH) grant funding were ranked considerably lower (Mullan, 2017).

While there are many institutions that reference social mission, it is important to consider the institutions whose commitment to social mission translates to medical school graduate outcomes, establishing their quest for health equity and compassionate patient care. While there are a variety of medical schools that may place emphasis on social mission, in their curriculum, experiential learning experiences, and research focus areas, including institutions that are dedicated

to community-based medicine and faith-based institutions (Hunt et al., 2011), research indicates that the three historically black medical schools focus the most on social mission (Lau, 2021; Morley et al., 2015; Mullan et al., 2010).

This is illustrated in that the graduates of the medical schools at Meharry Medical College, Howard University, and Morehouse School of Medicine are more likely than any other U. S. medical school place into primary care specialties, choose to practice medicine in areas that may have limited health care professionals and identify as underrepresented in medicine (Lau, 2021; Mullan et al., 2010). Mullan et al. (2010) used a *social mission score* in their research to identify the “percentage of medical school graduates who practice primary care, work in health professional shortage areas (HPSAs), and are underrepresented minorities” (p. 805). Mullan (2017) considered *underrepresented* to be physicians who identified as Black, Latinx or Indigenous and placed emphasis on the medical school graduates serving underserved populations and “making health not only better but fairer, more just, reliable and universal” (Mullan, 2017, p. 122). Mullan (2017) continued with other areas that align with social mission including the enrollment of minority populations, rural healthcare, and primary care. These schools rank highest in social mission not only because of their commitment to graduating underrepresented minorities but also because of the proportion of graduates that end up practicing in primary care.

Drawing the connection between social mission and primary care must surround an analysis of the literature relating to purpose, vision, and history of the HBCU medical schools. According to the U. S. Department of Education, an HBCU refers to a college or university with a primary mission of educating Black Americans founded before 1964 (Rodriguez et al., 2017).

Albritton (2012) considered an assessment of the United States after the Civil War and at the beginning of the Reconstruction Era asserting that “few universities espoused the mission and

goal of training and educating Black people” (p. 313). After Flexner’s unfavorable report, causing many medical schools to shutter their doors, only three black medical schools remained (Savitt, 2006) and while some predominantly white medical schools admitted minority students, the impact on the formerly segregated profession was definite (Arnett et al. 2016; Baker et al., 2008).

Essentially, there were few educational opportunities with only a handful of HBCUS available and other institutions remained racially segregated until the mid-1900s. As HBCU medical schools continue to prioritize social mission, serving underserved populations regardless of demographic and providing millions of dollars in uncompensated healthcare to those in rural and underresourced areas, the topic of medical social mission must involve the impact of not only the aforementioned Meharry and Howard, but also Morehouse School of Medicine in Atlanta, GA, and Charles Drew University of Medicine and Science in Los Angeles, CA.

There is no shortage of literature on the impact of HBCU medical schools or the significance of their commitment to educating and training. Although these institutions were intentionally excluded from the early 20th century “annual reports, articles, and commentaries on medical education” produced by the American Medical Associations (AMA), the Council for Medical Education (CME), and the “Journal for American Medical Association (JAMA), the impact that these institutions have had on the physicians that they trained and the patients they served has been invaluable (Savitt, 2006, p. 1418). Founded states apart, all three institutions placed emphasis on addressing health disparities, founded on the principles of caring for vulnerable populations and “producing a disproportionate percentage of the high quality and diverse health professionals that are dedicated to maintaining the health of an increasingly diverse nation” (Norris et al., 2009). All three institutions were founded on values that focus on eliminating health disparities, enrolling underrepresented minority students and serving in underresourced medical

specialties like primary care and underserved communities like rural areas (Mullan, 2017; Parham, 2021; Rodriguez et al., 2017).

Rodriguez et al. (2017) asserted that underrepresented medical students who identify as minorities are not only more likely to enter primary care specialties but are more likely than other racial and ethnic group to “choose to serve Black, Latino, or Native American populations” (p. 267). This 2017 study referenced the likelihood of underrepresented minority medical students to “choose to serve” underrepresented populations, but when the medical schools that identify as HBCUs were founded, the options for healthcare for minority populations were limited. Quadagno (2000) and D. B. Smith (1990) indicated that the U. S. healthcare system remained segregated until the Civil Rights Act of 1964, but still “compliance was uneven” (Quadagno 2000, p. 68) with many hospitals having a different standard of care for minority patients compared to white patients.

In addition to a connection between underrepresented minority medical students and primary care, there is a connection between underrepresented minority medical students and HBCU medical schools. While there is a dearth of underrepresented minority faculty and students, considering the medical school population as a whole, HBCU medical schools are “the only medical schools with a nationally representative presence of Black chairs, faculty, and students” (Rodriguez et al., 2017, p. 273), and over 20% of students who identify as Black receive their medical school education from an HBCU even though HBCU medical schools are less than 2% of the medical school population

The legacy of racism and discrimination against minorities within organized medicine has a long storied past and directly connects to the significance of the existence of Black medical schools. The first African American to earn a medical degree was Dr. James McCune Smith who

graduated from the University of Glasgow in Scotland in 1837 after he was denied entry to all of the American universities he applied to because he was Black (Morgan, 2003). Baker et al. (2008) described the founding of the National Medical Association (NMA) at the end of the 19th century, as founded in “reaction to the exclusion of black physicians by many state and local medical societies and the AMA’s refusal to recognize several racially integrated societies” (p. 309). As the segregated and racist beginnings of academic medicine were unfair to the physicians and those that desired to practice, there were also implications that affected the way African American patients perceived medicine (Alsan & Wanamaker, 2018; Ash et al., 2021; Gamble, 1995; Thompson et al., 2021;).

Medical Ethics and Patient Trust: Beyond the Tuskegee Study

There is a correlation between the need for physicians with cultural competencies and patient mistrust. Ash et al. (2021) explained that “historical traumas passed down through generations can provide crucial context” (p. 2) for why medical mistrust still occurs in many communities of color. In examining this history, it is critical to include ethical considerations that may impact modern medicine. In addition to medical experimentation, research and testing that was conducted on slaves (Ash et al., 2021; Gamble, 1995; Savitt, 1982), there are some major historical and contemporary examples of institutionalized racism and implicit bias (Alsan & Wanamaker, 2018; Miranda & Sanchez, 2014; Nix, 2017; Novak et al., 2018; Park, 2017; Skloot, 2017).

The Tuskegee Study of Untreated Syphilis in the Negro Male (TSUS) is also known as the Tuskegee Experiment (Miranda & Sanchez, 2014; Nix, 2017; Park, 2017). This study, both “unethical and deadly” involved knowingly withholding treatment from poor, African American, men in Tuskegee, Alabama, in order to study the diseases syphilis. This study was one of the first

documented instances of institutionalized racism in medicine. Experiments like the Tuskegee Experiment would do irreparable damage to the relationship between public health and the trust of the medical community for African Americans as after the study ended, “journalist, social scientists, and medical researchers have repeatedly pointed to the Tuskegee experiment as a reason African-Americans remain wary of mainstream medicine” (Alsan & Wanamaker, 2018, p. 416). Underrepresented groups have experienced institutionalized racism in healthcare and this has affected treatment plan and overall wellness (Alsan & Wanamaker, 2018; Novak et al., 2018; Skloot, 2017). Novak et al. (2018) highlighted California’s Eugenic Sterilization Program, which disproportionately affected Latinx patients. This law permitted over 30 states to “prevent the reproduction of individuals deemed unfit” and confirms research on bias, institutionalized racism in healthcare and “medical mistrust” (Novak, 2018, p. 612). Sterilization of underrepresented groups was also discussed by Torpy (2000), highlighting the illegal sterilization of women of color and poor women during the 1970s, referencing Native American Women and women of “Puerto Rican, Black, and Chicano” descent (p. 1).

The connection between medical mistrust, ethics, and the law is further analyzed in the life of Henrietta Lacks and the cell tissue known in the medical community as HeLa cells, the first “immortal cell line” (Truog et al., 2012, p.37) using the first two letters of her first and last name (Kemet, 2019; Lucey et al., 2009; Skloot, 2017; Sodeke & Powell, 2019; Truog et al., 2012). A patient at the Johns Hopkins University hospital, Lacks was receiving treatment for a cervical cancer diagnosis and during biopsies, her cells were retrieved and shared without her consent and without compensation (Sodeke & Powell, 2019). Because her cells grew at a faster rate compared to other cells, after her death at the age of 31, they were “mass-produced and distributed” (Sodeke & Powell, 2019, p. 2). The HeLa cells have proven invaluable to the international medical

community. Wolinetz and Collins (2020) make a powerful assertion in discussion the contributions of HeLa cells: “HeLa cells have played an extraordinary role in scientific research, underlying multiple Nobel Prize-winning discoveries and enabling medical advances for polio, cancer, Ebola virus disease, sickle cell disease, and countless other conditions” (p. 1027).

These examples that capture the essence of the prevailing medical mistrust in some minority communities may shed light on the correlation between race/ethnic identification and the COVID-19 vaccine (Ash et al., 2021; Bogart et al., 2021; Thompson et al., 2021; Warren et al., 2020). Thompson et al. (2021) conducted a study on inclination to participate in COVID-19 trials, and indicated that African Americans were least likely to participate followed by those that identified as Middle Eastern, North African, and/or Hispanic. Ash et al. (2021) addressed medical mistrust among “communities of color” due to history of “medical mistreatment and continued experiences of discrimination and system racism” (p. 1) but also considered other factors that may contribute to medical mistrust. Among other factors of medical mistrust Ash et al. cited loneliness and financial insecurity as predictive factors for medical mistrust, while “insurance status, neighborhood median household income, social support” (p. 1) and potential risk of contracting COVID-19 were not found as predictive factors.

Mitigation strategies are reviewed and include “large-scale coordinated grassroots efforts” in order to “reduce vaccine rejection and increase acceptance” (Thompson et al., 2021 p. 7). Warren et al. (2020) and Ojikutu et al. (2021) agreed that community engagement and leveraging community partnerships is key in building trust. Opportunities include opportunities for engagement with community-based organizations (CBOs), improving transparency, and continued acknowledgement of both present-day experiences but also historical experiences of indications of racism and bias in health care (Thompson et al., 2021)

Woods-Burnham et al. (2021) referenced the exclusion or suppression of Black Americans from higher education institutions that were not HBCUs, which may be attributed to the emphasis of social mission from HBCU medical schools. HBCU medical schools have a long-standing commitment to eradicating health disparities and an allegiance to social mission. Baker et al., (2008) further clarified the relationship between race, underrepresentation in medicine, and the lack of trust in predominantly black communities of the medical field:

The complex history of race in the medical profession is rarely acknowledged and often misunderstood. Yes, US medicine's legacy of segregation and racism is linked to the current paucity of African American physicians, distrust of professional associations by some physicians, and contemporary racial health disparities. (p. 206)

This emphasis on social mission directly impacts the outcomes of graduates, as highlighted in the literature (Morley et al., 2015; Mullan et al., 2010). Understanding these implications on graduates in primary care and the emphasis on underrepresented minorities can provide insight on the application process and how the admissions process can be influenced in a medical school with a social mission. As social mission becomes an emerging theme in medical school mission statements, this topic is used as a data point in the admissions process for medical schools. While Ellaway et al. (2018b) indicate that there is not a “direct connection” between social missions and admissions, another study (Ellaway et al (2018a) referenced that among a group of eight medical schools, a focus on social mission is an expression of the institutions “commitment to service, responsibility and accountability” (p. 171). Similarly, Evans et al. (2020) referenced medical schools using direct strategies to recruit students at colleges and universities, indicating that students interested in social mission are “likely to practice in rural, urban, underserved, or primary care settings” (p. 474). The literature indicates that admissions committees can use these data points to inform their selection process.

Medical School Curriculum Reform

The need for healthcare professionals and the physician shortage during the pandemic has highlighted the educational delivery model many schools have adopted. The method that institutions use to present foundational material to medical students has been considered especially in light of new technology (Denny et al., 2003; Vidic & Weitlauf, 2002). Medical education has evolved significantly, far away from the Flexner report and his belief that “medical schools should be university based, have minimum admission requirements, implement a rigorous curriculum with applied laboratory and clinical science content, and have faculty actively engaged in research” (as cited in Buja, 2019, p. 2). A contemporary of Flexner’s in Europe was Canadian born William Osler, whose beliefs were diametrically opposed to Flexner’s in his “approach to bedside teaching and his insistence that students learn from their patients” (Norman, 2012, p. 11). Buja (2019) and Sesate et al (2017) described the combination of the two approaches as what many know as the *traditional undergraduate medical education program*, the curriculum before residency, that involves two years of basic science coursework followed by the same number of years of clinical rotations. Medical school faculty have considered in recent years a curriculum that is more integrated (Brauer & Ferguson, 2015; Buja, 2019; Dienstag, 2008; Gonzalo et al., 2018; Muller et al., 2008; Schwartzstein & Roberts, 2017). Dienstag (2008) referenced the integrated curriculum established at Harvard Medical School in 1985. Typical integration involves more “active learning and less passive learning” (Buja, 2019, p.5) and replaces with the traditional lecture instruction style with “small group sessions, problem-based learning, self-directed learning, team-based learning and flipped classrooms” (Buja, 2019, p. 5).

Schema based education is rooted in psychology and involves grouping or classifying information (Blissett et al., 2015). In medicine, Blissett et al. (2015) reported that schema-based

instruction is a “diagnostic algorithm that organizes a differential diagnosis by the presenting complaint and provides clinically relevant discriminating features to distinguish similar diagnoses” (p. 335). This type of instruction reduces “cognitive load by presenting the most important links between interacting elements” (Blissett et al., 2012, p. 815). Some research indicates that student performance increases in addition to the ability to retain knowledge while other research asserts that schema based is not ideal for diagnoses that have not been learned so would not help if a student was not familiar with the content (Beck & Bergman, 1986; Blissett et al., 2012; Blissett et al., 2015; McLaughlin & Mandin, 2002).

Problem based learning embraces self-directed learning where medical students “learn while engaging actively with meaningful problems,” (Yew & Goh, 2016, p. 76), working in groups on a “clinical case” (Neville, 2009, p. 2) and make the proper decision in an aim to solve the patient’s problem. The research asserts that this instruction style is beneficial for students in that they “learn content independently” (Chang, 2016, p. 89) and graduates of schools that have problem-based learning indicate they are better prepared for medical practice with honed skills in communication and teamwork (Malik & Shakeel, 2020; Prince et al., 2005).

In addition to structural changes to the curriculum, specifically teaching style and pedagogy, many institutions consider additions as far as content. Buja (2019) discussed a *health systems science* perspective that involves topics like health policy and population health. Other considerations include courses on cultural competence (Lim et al., 2008; Loue et al., 2015) and practicing compassionate medicine such as a critical race theory course for medical students (Tsai, 2021).

A close examination of how racism has been ingrained in societal structures, “reinforcing racial inequality in maternal health” (Taylor, 2021, p. 506) is also critical in understanding other

prejudicial social structures, such as homophobia, and helping to direct how LGBT instruction could improve the “quality of doctor-patient interactions, to facilitate patients’ disclosure of sexual orientation and gender identity in healthcare and increase the quality of healthcare” (Arthur et al., 2021, p.1).

COVID-19 and Curriculum Implications

Since the COVID-19 epidemic has been drastically affecting world populations, the medical community has had shared observations of learning loss and of the transition from in-person to remote learning internationally and in the United States (Dost et al., 2020; Grand et al., 2021; Puljak, et al., 2020; Shahrivini et al., 2021). Grand et al. (2021) considered the experience of students at the Albert Einstein College of Medicine in the New York burrough of the Bronx, and Shahrivini et al. (2021) assessed University of California San Diego (UCSD) students in their School of Medicine. Shahrivini et al. (2021) assessed the perceptions medical students at UCSD students had on learning virtually during COVID-19, particularly students in their basic science and foundational M1 and M2 years. While the majority of the students surveyed benefited from the self-paced flexible nature of remote learning, many indicated that they were ill-prepared for the first exam in the USMLE series and were of the opinion that “remote learning had negatively affected the quality of instruction and their ability to participate” (Shahrivini et al., 2021, p.1). Conversely, Grand et al., 2021 found that exam scores for students at Albert Einstein did not fluctuate and for class sessions, “a switch to remote-based learning resulted in greater attendance, an increase in student voluntary contributions, higher quality of student discourse, and higher faculty satisfaction” (p. 6) Shahrivini et al.’s (2021) research focused specifically on UCSD first and second year medical students during a survey conducted on the effect remote learning had on their educational experience, from current participation to future readiness in various curriculum

modules. At UCSD, students in their first year of education (M1 students) are immersed in the basic sciences but during their second year (M2 year) these students are “focused on anatomy, pharmacology, histology, and pathology” (Shahrivini et al., 2021, p. 3).

Clinical skills, training that is typically held in laboratories or during the M3 and M4 clerkship years (Tolsgaard, 2013), is throughout the curriculum at UCSD. Students indicated that some modules were positively affected by the transition to remote learning, including “lecture-based learning and problem-based learning” but other modules were affected negatively by the transition, including “anatomy, ultrasound, and the ambulatory care preceptorship” (Tolsgaard, 2013, p. 3). Methods to consider for enhancing the remote learning experience include recommendations for faculty and students. Students indicated that training that would improve faculty use of technology would prove beneficial in addition to “videocasted lectures uploaded in advance” (Tolsgaard, 2013, p. 1).

Said and Schwartz (2021) described tele-teaching during the pandemic and modifying medical education in order to address the remote educational delivery model due to COVID-19. The authors describe a curriculum model development program designed by Dr. David Kern that involves a framework for “remote teaching sessions” (Kern, 2016, p. 5). Kern’s model involves a “(1) problem identification and general needs assessment, (2) targeted needs assessment, (3) goals and objectives, (4) educational strategies, (5) implementation, (6) evaluation and feedback” (Kern, 2016, p. 7). This teaching methodology “improves the virtual classroom” and is designed to provide “high quality remote education” (Said & Schwartz, 2021, p. 812).

Medical School Education: Global Leadership and Mission Statements

Global leadership competencies are key to the future of medical education. As medical education becomes more global, it is important to consider these competencies, like conflict

negotiation and understanding of diverse perspectives (Bird & Stevens, 2013; Jokinen, 2005; Tubbs & Schulz, 2006) in correlation with medical school core competencies, as defined by the AAMC. In addition to shaping the medical school curriculum to focus on learning outcomes, preparation for global leadership is also prevalent in the literature. Jokinen (2005) discussed competencies of global leaders and the need to assess which are relevant based on potential interactions, including projects and task forces. This is relevant as it pertains to medical school education and what competencies are learned and developed during matriculation. As Jokinen described competencies as “certain personal traits, behaviors, skills, values, and knowledge” (p. 201), the AAMC references core competencies as the “knowledge, skills, attitudes, and experiences valued by medical schools.” Competencies like cultural competence, defined as a demonstrated “knowledge of socio-cultural factors that affect interactions and behaviors” and consistently engaging “diverse and competing perspectives as a resource for learning, citizenship, and work” are among traits that the Committee on Admissions of the AAMC Group on Student Affairs has indicated are key for entering students (AAMC, 2021, p. 1).

While leadership is not one of the 15 core competencies as outlined by the AAMC, defining global leadership competencies encompasses many of the other competencies like resilience, cultural competence and service orientation. The research highlights a number of competencies for global leaders (Bird & Stevens, 2013; Hassanzadeh et al., 2015; Jokinen, 2005). Hassanzadeh et al. (2015) identify an awareness and sensitivity to other cultures and perspectives, the ability to maintain relationships and communicate with clarity, and learning from past experiences as critical competencies for global leaders. Thorn (2012) agreed with leaders “being communicative” (p. 163), but also adds integrity, charisma, being inspirational and building teams to the list. Global leadership competencies are critical for organizational leadership and parallels

are found in the literature to physician education (Bird & Steven, 2013; Hassanzadeh et al., 2015; Thorn, 2012).

The competencies for global leaders outlined by Hassanzadeh et al. (2015) align with Thorn (2012) in the importance of communication and “developing and maintaining relationships” (p. 137), which is reminiscent of Thorn’s perspective on teamwork. Bird and Stevens (2013) research is consistent with the literature in the authors’ creation of three categories for competencies for global leaders: “(1) business and organizational acumen, (2) managing people and relationships, and (3) managing self” (Bird & Stevens, 2013, p.208). Admissions committees can use the research on these competencies in conjunction with the core competencies for medical school applicants to assess, review and enroll a medical school class that connects with, understands and can interpret the mission of the institution.

The mission statement of an organization embodies its values, founding principles, and vision (Campbell, 1997; Davis et al., 2007; Morpew & Hartley, 2006; Pearce & David, 1987; Stemler & Bebell, 1999). Pearce & David (1987) identified several critical elements of mission statements which involve “(1) target customers, (2) basic products or services, (3) primary markets, (4) principal technology, (5) concern for survival, growth and profitability, (6) company philosophy, (7) company self-concept, and (8) concern for public image” (p. 109). Whether the mission statements are from Fortune 500 companies and corporations (Cochran & David, 1986; Khan et al., 2017a; Leuthesser & Kohli, 1997), colleges and universities (Atkinson, 2008; Morpew & Hartley, 2006) or even specific to the type of institution, like colleges of business (Pitt et al., 2010) or schools of social work (Holosko et al., 2015), early studies on mission indicate that “developing a mission statement is an important first step in the strategic planning process, according to both practitioners and research scholars” (Pearce & David, 1987).

The research is largely divided on whether mission statements are applicable and effective in organizations as far as purpose and even what the statement should be called (Baetz & Bart, 1996; Campbell, 1997; Cochran & David, 1986; Davis et al., 2007). Cochran and David (2008) describe classifications that include statements of creed, purpose, philosophy or providing a definition on the business and the way the business functions. Similarly, Davis et al. (2007) contended with the way explicit language in a mission statement informs the way affiliated members view themselves and the organization. While Baetz and Bart (1996) asserted that mission statements are invaluable as an organization strives to establish and implement strategy, Campbell (1997) considered if the mission statements themselves have value or if they are only an “obligatory part of a company’s portfolio of literature” (p. 931). Campbell compared companies’ mission statements to marketing material as Davis et al. (2007) also agreed that the statements themselves are not as critical as the knowledge gained from developing them.

Fairhurst et al. (1997) indicated that mission statements are meant to be both internal and external in that they are adopted by the company and its members and communicated to those the company seeks to serve. Considering external constituents, Cochran and David (1986) evaluated whether company or organizational mission statements are functional or simply front facing. For internal constituents, Cochran and David indicated that the mission statements ability to inspire, motivate, and generate an emotional response results in the mission statement reader’s support for the organization. This is consistent with the research on other companies and organizations (Khan et al., 2017b, Rajasekar, 2013, Sattari et al., 2011) valuing the “readability and understandability” of statements that are focused on the needs of the stakeholder or target audience (Khan et al., 2017b, p. 123).

Stemler and Bebell (1999) considered education and the difference between themes prevalent in elementary school and college mission statements. The authors asserted that while emotional development is consistent among mission statements for the early years of K-12 education, for higher education, intellectual development is the primary theme. While the mission statements for higher education institutions are assessed in the literature for “relevance and purpose” (Holosko et al., 2015, p. 222; Khalifa, 2012; Meacham, 2008), scholars are divided on their function. Some assert that mission statements are key for strategic planning (Ireland & Hirc, 1992; Morpew & Hartley, 2006; Pearce & David, 1987) and directing the decision-making process in the interest of institutional purpose (Lang & Lopers-Sweetman, 1991), establishing goals for student learning, (Meacham & Gaff, 2006) and find that they inform the creation or elimination of new programs (Morpew & Hartley, 2006; Ozdem, 2011). Others question their validity (Davis et al., 2007; Newsom & Hayes, 1991).

Considering change management and the culture of organizations (Hartley, 2014), the literature indicates that the for the actual creation of a mission statement, more than just documentation and drafting is required but “it requires an effort akin to a sociocultural movement” (Hartley, 2014, p. 12; Williams et al., 2014; Wright, 2002). Mission statements done correctly can lead to positive student outcomes and ethical responsibility among students, indicating that there was a correlation between universities with integrity and ethics in the mission statements and the “perceived character trait importance and character reinforcement” of the university’s students (Davis et al., 2007, p. 99). The knowledge that mission statements have a considerable effect on the members of the organization or institution provides insight for organization culture and day-to-day operations, especially surrounding the mission of medical schools and how they teach their students.

Medical school composition and curriculum is rooted in the institution's overall goals, vision, and mission as acknowledged by the institution's mission or vision statement. A medical school's mission statement highlights expected learning outcomes, research areas, "institutional identity and educational purpose" (Grbic et al., 2013, p. 852; Morley et al., 2015; Valsangkar et al., 2014). A conversation that is prevalent in the literature (Grbic et al., 2013; Morley et al., 2015; Valsangkar et al., 2014; Walsh, 2015) concerns whether the mission statement of an institution is in alignment with the target population's needs (Valsangkar et. al., 2014). Comparing themes within mission or vision statements that are considered traditional compared to themes that are "emerging" (Valsangkar et. al., 2014, p. 894) provides context for comparison and community needs assessment. Valsangkar et al. (2014) conducted a review of themes that are considered traditional in medical school mission statements, including commitment to service, academic focus and research driven, in addition to themes that are "emerging" (p. 892), including but not limited to a commitment to diversity, focus on primary care, and the ability to manage expenditures. Within the traditional and emerging themes were sample keywords that aligned with the overarching theme. For instance, research also involved keywords or phrases like *discovery*, *scholar*, and *producing new knowledge*, while service considered *general well-being of humanity* and *common good* (p. 894). Ultimately, the authors argued that emerging themes are more in line with the needs of the community and should be a part of the mission statement. Even as some schools prioritize research and place emphasis on service, Walsh (2015) argued in favor of student interest. Walsh asserted that even though research may produce opportunities for funding for medical institutions, medical schools should focus on teaching that is in alignment with a curriculum in the students' best interest and not a curriculum rooted in a "type of research that wins grants and attracts faculty"

(p. 332). Walsh stressed the importance of teaching and learning outcomes dictating the curriculum instead of grant funding opportunities.

Some studies compare institutions that focus on research to those that focus on social mission, in addition to comparing the mission and vision of private medical schools compared to public medical schools (Grbic et al., 2013; Campbell & Tumin, 2021; Kreber & Mhina, 2007; Mullan et al, 2010; Mullan, 2017;). Grbic et al., 2013 studied U. S. medical school mission statements that award the doctor of medicine (MD) degree and draw connections based on word choice. The authors conducted an analysis of shared concepts between research, private, public and social mission medical schools. Their findings show that certain concepts are found in more mission statements of social mission driven medical schools than research focused medical schools. Additionally, there is a difference among private medical schools in comparison to public medical schools (Grbic et al., 2013).

Words or concepts like *leader* are found in research focused institutions while Grbic et al. (2013) discovered that the word *people* is “more central within the mission statements of leading social mission schools” (p. 856). Common among all medical school mission statements were concepts like *health*, *education*, *premier*, and *research*. While research, education, and health were all concepts considered among research institutions, public schools and private schools, “*people*” and “*health care*” were key concepts among medical schools that placed emphasis on social mission (Grbic et al., 2013, p. 857).

Instead of concepts, Hafferty et al. (2019) discussed critical themes and the frequency of use in U. S. medical school missions or vision statements. The authors considered the pattern of themes like a reference to learning environment, the mention of compassion and other “humanistic” qualities, (p. 724) and an emphasis on recruiting or targeting the “underserved or

race/ethnicity for healthcare services” (p. 724) with an emphasis on cultural competency. Just as Mullan et al. (2010) described the fundamental function of medical schools as a training ground for health professionals that will serve the nation, conversations surrounding physician access, specialty type and social mission (Morley et al., 2015) are also considered (Grbic et al., 2013; Kim and Choi, 2021; Morley et al., 2015; Mullan et al., 2010; Valsangkar et al., 2014).

Kim and Choi (2021) recommended using “outcome-based education in improving medical education quality” (p. 215) and indicated that the expectations for student learning is directly related the mission and vision of an institution. Kim and Choi also asserted that the mission statement of a medical school establishes the standards that eventually control the goals and outcomes of education in addition to the quality of the education. Valsangkar et al. (2014) also considered mission statements but addressed life after medical school by examining the connection between medical school mission statements and the type of physicians that are produced to tend to the country’s health care requisites.

Even as research and education and service were prioritized and among shared themes in medical school mission statements, themes that relate to the future of healthcare, like “prevention and cost control” and primary care and diversity (Valsangkar et al., 2014, p. 894). Valsangkar et al. (2014) argued that if these “emerging themes” are not considered as important in school’s mission statements, they will not be considered critical and will not be adopted or incorporated by physicians in their practice in order to address significant health care needs (Kim and Choi, 2021).

Fairhurst et al. (1997) considered the ability of mission statements to shape the culture of the company, organization, or institution. Drawing from Kotter (2007) and Senge (2006), Fairhurst et al. (1997) considered the potential failure of organizations because of ineffective communication. Kotter asserted that one reason organizations are not successful is due to lack of

vision, indicating that the inability to convey and articulate the vision in “five minutes or less and get a reaction that signifies both understanding and interest” can be stifling to the growth and transformation of organizations (Kotter, 2007, p. 101). Senge (2006) echoed these sentiments in emphasizing the importance of a shared vision, a shared passion, and shared awareness of unity “that permeates the organization and gives coherence to diverse activities” (Senge, 2006, p. 191).

The Role of the Admissions Committee in the Admissions Decision Process

Academic prowess is crucial as admissions committees review MCAT scores and grade point average, but other factors are becoming increasingly as if not more important. These factors include grades indicating an upwards trajectory, commitment to service, and other data points that can provide admissions committees with data to categorize the volume of medical school applicants. Research indicates that as a result of COVID-19 and what some call the Fauci effect, 18% more students submitted an application to medical school in 2021 than the previous year (Cervantes, 2021). This has shed light on how admissions committees make decisions on selecting students for the incoming class. Admissions committees for medical schools use a number of factors for the initial review, interview, and selection of candidates for class. In addition to grade point average, personal statement, extracurricular involvement and community service, medical schools have also employed other methods to ensure that the students they admit connect with the institutions mission statement and holistic selection review process. Pflipsen et al. (2021) discussed that in addition to academic achievement, including standardized test scores (MCAT), grade trajectory and final grades as a predictor of student success, admissions committees also consider what factors will be critical for the medical school program years that involve clerkship, which is training in the form of medical rotation meant to expose students to different fields or specialties such as psychiatry, internal medicine, surgery. During the clerkship years, which typically occur

during the end of undergraduate medical education after the basic science coursework has been finished, students complete *rotations* in a variety of medical specialties to identify their area of interest; once this area is identified, students are able to submit application to residency programs in these specialties with the goal of getting selected. Pflipsen et al. (2021) argued that there may be traits that are ideal for the clerkship years may involve “personal competencies” (p. 2).

Referring to work from Herrera et al. (2019) and Fürstenberg and Harendza (2017), Pflipsen et al. (2021) differentiated traits that are ideal for students at every level of the medical school process: (a) prospective students, (b) current students, and (c) medical school graduates that are in their intern or PGY1 year, indicating their first year of residency. Traits in the research conducted by Fürstenberg and Harendza considered competencies such as (a) ethical awareness, (b) responsibility, (c) safety and risk management, (d) coping with mistakes, (e) empathy and openness, and (f) active listening to patients. The authors assessed these competencies and sought the perspectives of both physicians and medical students. Fürstenberg and Harendza asserted that when asked about the trait that is the most important for intern or PGY1 year students, both medical students and supervising physicians indicated that responsibility was the most important trait. As a comparison, medical students ranked communicating with patients higher than the physicians who ranked patient management higher. Following responsibility, the ability to work as a team and be collegial, possessing empathy and openness, knowledge of personal limits and potential, and structure and planning were among the top competencies (Fürstenberg & Harendza, 2017).

Among other critical factors, the admissions committee reviews personal statements and letters of recommendation, which DeZee et al. (2014) correlated with peer approval and honors society membership. Other personal traits including honesty and energy are assessed through

personal statement and interview (Albanese et al., 2003). Albanese et al. (2003) highlighted the importance of the interview which, beyond the conversation between the candidate and the reviewer, includes “orientation activities, tours, interactions with current students, luncheons” and other events (p. 316).

In an analysis of assessing personal qualities in a candidate, Albanese et al. (2003) asserted that the interview is the most effective and Edwards et al. (1990) indicated that the interview serves four primary functions: (a) to gather information about the candidate, (b) to render an admissions decision, (c) to verify information that the candidate has been included in their application, and (d) to recruit them for the medical school program. The traditional medical school interview process typically involves a conversation or question and answer session between the candidate and a faculty or staff reviewer (Albanese et al., 2003; Edwards et al., 1990). Gay et al. (2018) indicated that even though the academic components of a candidate’s admission file are important, when a reviewer is not presented with their metrics before the interview, they focus on “nonacademic characteristics” (p. 151).

Considering best practices and the most recent disposition of the admissions process, committees have started to use Multiple Mini Interviews (MMIs) to review candidates (Cleland et al., 2020; Eva et al., 2004; Lemay et al., 2007; Pau et al., 2013; Yen et al., 2011). Eva et al. (2004) described MMI’s as interview stations that assess students’ ability to think critically, communicate and make decisions. In addition to assessing non-cognitive factors (Yen et al., 2011), MMI’s make assessments on emotional intelligence and ethical reasoning. Similarly, some medical schools have adopted other data points that embrace the holistic review process using exams like CASPer (Dore et al., 2017; Yingling et al., 2018). Like the MMI, the CASPer exam measures personal and professional qualities (Dore et al., 2017) in a variety of situations. The aim is to provide the

admissions committee with additional data points beyond MCAT, grade point average and other traditional admissions factors.

Pre-Medical Programs and Opportunities for Underrepresented Groups in STEM

In addition to elementary school, middle school, and high school pre-medical programs, there are implications for students who are exposed to medical education through pre-medical experiences in community colleges, particularly among students that may be “high achieving and low income” (Talamantes et al., 2018, p. 303). Dubetz and Wilson (2013) indicated that there is a gender gap between girls and boys in science and math. While the performance of female and male students is equal in grades during early childhood education, “girls’ scores decrease relative to boys’ scores in later grades” (p. 41). Similarly, Reinking and Martin (2018) addressed a “recognized phenomenon in society that advances men in fields related to STEM while discouraging or leaving women behind” (p. 148). Reinking and Martin continued to discuss theories of the STEM gender gap, which explains why there is a dearth of women in science, technology, engineering and math (STEM). Gender socialization (Reinking & Martin, 2018) refers to “practices that occur in childhood such as boys are smart in math and girls are good in the kitchen” and “feed into the concept of stereotype threat, which can undermine girls’ performance in STEM fields” (Reinking & Martin, 2018, p. 149).

Gonzalez-Perez et al. (2020) indicated that female STEM role models may be critical in their ability to inspire girls to select careers in the STEM field. In their study, the authors found that when girls had female role models, they were more likely to enjoy math, believe it is an important subject and expect to be successful (Gonzalez-Perez et al., 2020). Sainz and Eccles (2012) asserted that girls are not likely to select an interest in the STEM field if they have negative assumptions about mathematics and technology and allow gender stereotypes to affect them. Gonzalez-Perez et

al. (2020) confirmed that the impact that unfair stereotypes based on gender have girls considering their interest in STEM and “expectations regarding their abilities and skills in a usually male-dominated world” (p. 2204). As we consider pre-medical programs and underrepresented groups in STEM, Keith and Hollar (2012) also supported pre-medical programs, highlighting the research that found girls in their senior year of high school were more likely to pursue careers in science if they had support from friends and mentors.

The negative perspective about their abilities in STEM experienced by girls in elementary (Shapiro & Williams, 2012) and middle school can continue in high school and college (Wu et al., 2020). Women that were a part of a “single-sex STEM program” were more engaged and were more likely to pursue careers in fields where they were underrepresented (Rosenthal et al., 2011, p. 725).

Summer research opportunities in STEM are often implemented as a way to increase participation of underrepresented groups (Hirsch et al., 2011; Talamantes et al., 2018; Whalin & Pang, 2012). Whalin and Pang (2012) highlighted the enrichment program that occurs during the summer months at Jackson State University, which is designed to retain and graduate first year engineering students. Retention programs like the summer enrichment program at Jackson State align with the literature on summer enrichment or bridge programs for first year students (Cabrera et al., 2013; Lawson et al., 2016; Suzuki et al., 2012). Additionally, the Biomedical Sciences Program or Health Careers Opportunity Pre-Baccalaureate Program was established at Meharry Medical College as a summer enrichment program to “increase the enrollment of minority students in health professions schools” (Wilson & Murphy, 1999, p. 400). Wilson and Murphy (1999) asserted that over a 30-year period, the majority of the students who applied to these enrichment programs were admitted to health professions programs and graduated.

There are implications for groups underrepresented in medicine referenced in the literature, particularly surrounding premedical education and gender. Women enter premedical programs at the same rate as men but are not as likely to finish the premedical program and less likely to submit an application to medical school (Fiorentine & Cole, 1992). While Fiorentine and Cole (1992) rejected the notion that women in premedical undergraduate, compared to male students, do not matriculate or apply to medical school at the same rate, Witherspoon (2019) referenced the lack of equity, significant “barriers for women” that occur during medical training and the prevalence of “male-dominated specialties where women’s health issues are often relatively understudied” (Witherspoon et al., 2019, p. 193).

There are several versions of the MCAT referenced in the literature that are used to compare what medical school applicants are expected to know and how they perform. The 1991 MCAT the “natural sciences” in addition to assessing an applicants’ ability to “demonstrate a variety of analytical and reasoning skills” (Kroopnick, 2013, p. 737). The 2015 MCAT, also known as the *new MCAT* also measures applicants’ knowledge on “concepts from the behavioral and social sciences” (Kroopnick, 2013, p.737).

Pervasive in the literature are factors that admissions committees can use when reviewing applicants for the class to identify students that will be successful throughout matriculation. R. F. Jones and Thomae-Forgues (1984) discussed the concept of MCAT in the admissions application process and whether the standardized test can forecast the way students will perform during the initial years of their medical school education. The authors also indicated that in addition to MCAT predicting performance, predictions are able to be made for performance on National Board of Medical Examiners USMLE Part 1, which has been consistent in the literature since the 1980s and 1990s (Johnson et al., 1986; R. F. Jones & Thomae-Forgues, 1984; Mitchell, 1990; Zeleznik et al.,

1987). Julian (2005) completed a study that predicted student performance in medical school, USMLE board examinations, and residency (graduate medical education) on the basis on MCAT in comparison to grades achieved in medical school.

The MCAT was introduced in 1977 and since has been rescored in the most recent 2015 MCAT exam to include elements of behavioral and social sciences, the elimination of the writing section, and significantly more test questions than the earlier version of the MCAT (Kroopnick, 2013). The proposed study examines students that did not do well on the MCAT exam and still performed well in their first years of medical school, subsequent licensure exams, and achieved residency placement, against the research on predictive validity (R. F. Jones & Thomae-Forgues, 1984).

Challenges to Matriculation: Risk, Resilience and Protective Factors

Issues of risk and resilience theory are prevalent in the literature to predict success of those who prevail despite incredible odds. From academic performance (Hanson et al., 2003; Shatkin et al., 2016) to growth and development (Fraser, 1997; Masten, 2013), risk and resilience focus on the ability to adapt and to be flexible “in the context of conditions that could post a significant threat to function or development (Masten, 2013, p. 579). Central to the discussion on medical school performance are those students that are at risk for not doing well based on metrics but are successful because of noncognitive factors and other factors vital to the holistic review process.

A discussion on challenges to matriculation must address academic achievement, particularly surrounding the MCAT and test anxiety (Green et al, 2016; Paul et al, 2013; Powell, 2004). Terregino et al. (2020) indicated that as medical school admissions committees use the MCAT and other factors to review applicants, MCAT has not always been a predictive factor of student success. In fact, Terregino et al. asserted that a robust review of the “learning environment

that enable students with a wide range of MCAT scores to thrive” is necessary due to compelling proof that the majority of medical students with average scores on the MCAT ultimately “succeed in medical school” (p. 344). Additionally, Muller and Kase (2010) push backed against the traditional premedical school curriculum examining students in residency, comparing those students that embarked on traditional preparation for medical school, including a foundation in the basic sciences, to students that selected a major that was in the discipline of humanities or in the social science discipline and did not sit for the MCAT exam. The authors found that there was not a difference between students who did not take the MCAT and majored in the humanities or social sciences and those who embarked on the traditional pre-med curriculum.

The challenges for medical school matriculation range from socio-emotional issues to navigating their identity as a student and healthcare professional (Weurlander et al., 2019; Wilson et al., 2013). Considering issues of identity, medical students experience “imposter syndrome” (Russell, 2017, p.1070), which occurs when students, despite achievement, feel incapable and undermine and feel doubtful about their abilities (Mullangi & Jagsi, 2019; Russell, 2017; Villwock et al., 2016). Russell (2017) described imposter syndrome in medical students as instances when students feel inadequate, without significant experience and as if they do not fit in. Villwock et al. (2016) espoused a similar definition, but connected imposter syndrome with burnout, asserting that imposter syndrome relates to many facets of burnout, including but not limited to cynicism, physical exhaustion, and being emotionally exhausted.

Burnout, depression, and stress are prevalent in the research when understanding the journey medical students faced to earn their medical degree (Dyrbye et al., 2017; Thuma et al., 2020; Voltmer et al., 2021). In fact, the wellness of medical students has been addressed significantly in studies that consider “medical student anxiety, depression, burnout, and suicidal

ideation” (Caceres & Lizotte-Waniewski, 2021, p. 877). In addition to the academic workload, a number of other issues contribute to the “psychological and emotional distress for students” (Caceres & Lizotte-Waniewski, 2021, p. 516) including but not limited to, lack of sleep, medical student abuse or medical student mistreatment, frequency of testing, and being affected by patient treatment outcomes (Cook et al., 2014; Dyrbye et al., 2008; Thuma et al., 2020; Voltmer et al., 2021).

While there is significant research about the stressors and risk factors of medical students during matriculation, there is not much on the protective factors that make students resilient and support their physical, mental, emotional and academic health. Thuma et al. (2020) indicated that there is a connection between mental and physical health and find that students who have a regular exercise or fitness routine are “less likely to experience burnout, [more likely] to have a higher quality of life, and to have a better mental health status” (p. 519). This is confirmed by Dyrbye et al. (2017), who asserted that when abiding by the recommendations for exercise from the Centers for Disease Control and Prevention (CDC), students find levels of burnout that are significantly lower but experience an overall quality of life that is well above average.

Many researchers considered fostering student mental health as a way to progress quality of life and decrease burnout, depression and, suicide ideation (Shiralkar et al., 2013; Voltmer et al., 2021). Voltmer et al. (2021) indicated that activities that involve meditation and mindfulness are key to reduce stress. Morales (2014) described academic resilience as the “academic achievement of students who possess and confront risk factors that predict failure for most students from similar circumstances” (p. 93). As risk is considered, the protective factors that cause the student to be resilient are also addressed. As it is connected to resilience (Keyes, 2005), a “protective factor is not defined by the absence of a risk factor” (Cha & Nock, 2009, p. 424), but does lessen or

alleviate a risk factor (Keyes, 2005). A protective factor diminishes the likelihood of risk and allows for resilience. The protective factors that best serve prospective medical students are in alignment with the critical competencies for success.

Key Competencies for Medical Student Success

Competencies, including grit and resilience, will inform this study, particularly the questions asked to the panel of experts during the modified Delphi process. After medical school, graduates enter a residency program for their graduate medical education (AAMC, 2021; Lieu et al, 1989; Peterkin, 2016). In a residency program, graduates hone their skills in a particular specialty, including but not limited to emergency medicine, internal medicine, pediatrics and neurosurgery. There are some skills in the literature that are germane to a specific specialty (Chan et al., 2012; J. B. Jones, 1999; Nair, 2019; Rosenzweig, 1991; Wayne et al., 2006a). While Chan et al. (2012) referenced the value of interpersonal communication for emergency medicine residents, paying close attention to grieving patients, delivering bad news and conflict management, Jones (1999) stressed the importance of teaching emergency medicine residents in the emergency department (ED) how to manage pain, asserting that the most frequent concern of patients in the ED is pain. Rosenzweig (1991) agreed with both Chan et al. (2012) and J. B. Jones (1999) asserting that skills necessary for residents in the ED include managing patient pain and “empathic listening” (Rosenzweig, 1991, p. 72).

Pugh et al. (2015) made an assessment of both technical skills, such as “thoracentesis and lumbar puncture” and “non-technical skills,” such as communicating with clarity and maintaining professionalism, required of internal medicine residents (p. 85). Hayes et al. (2007), Wayne et al. (2006a), and Wayne et al. (2006b) referenced the level of comfort residents have with cardiac arrest teams and cardiac life support as a skill set necessary for internal medicine residents.

Leading a cardiac arrest team is rooted in communication, which Langewitz et al. (1998) asserted is critical to not only receive medical information from patients but also to “communicate about aspects of medical treatment” (p. 268).

While other specialties may span age ranges, specialties like pediatrics and geriatrics involve a specific patient base. Pediatricians specialize in the child population and the skillset recommended by residency programs reflects this population (American Academy of Pediatrics Committee on Pediatric Workforce, 2005). While technical skills specific to the population include the ability to revive an infant at the time of birth (Nadel et al., 2000; Patel et al., 2012), Horky et al. (2017) evaluated a “cross cultural curriculum” in shaping the skills of pediatric residents (p. 1537). Nair (2019) discussed the importance of role play as a communication tool for students in the department of pediatrics, which connected to Jewett et al.’s (1982) discussion on *crisis counseling* skills for pediatric residents, providing examples of delivering bad news to parents about their child. Both authors stressed the importance of communication.

Haglund et al. (2015) and Harnof et al. (2013) referenced the challenging conversations that neurosurgeons may have with their patients and patients’ families. Haglund et al. (2015) referenced specifically the importance of communicating with empathy and compassion as neurosurgeons often must discuss life threatening issues related to the brain, spinal cord and other “high-risk complex” procedures (p. 395). Choudhury et al. (2013) indicated that the technical skills required of neurosurgeons, precision, execution, and using tools that may involve new machines equipped with algorithms that actually conduct the surgery, are often taught in the operating room (OR). Haglund (2015) referenced the importance of technical skills but indicated that it is unlikely medical students select a career in surgery considering the difficult conversations that may ensue. Selden et al. (2012) and Harnof et al. (2013) referred to robust training programs that teach

residents both technical and non-technical skill, placing emphasis on the importance of patient care.

Whether through the patient interview (Langewitz et al., 1998), ethical scenarios and delivering news that may be unfortunate or devastating (Harnof et al., 2013; Jewett et al., 1982; Pugh et al., 2015; Serwint & Rutherford, 2000) or leading a cardiac arrest team (Wayne et al., 2006a), a common competency across specialties is communication (Jewett et al., 1982; Langewitz, et al., 1998; Rider & Keefer, 2006; Serwint & Rutherford, 2000). Rider and Keefer (2006) asserted that the improvement of healthcare outcomes for patients is directly related to the communication and interpersonal skills of doctors. Brown (2008) itemized elements of “clinical communication” (p. 272), including but not limited to explaining a patient's medical history, discussing a patient’s treatment plan, and delivering news to the patient.

In addition to communication, critical competencies for success also involve protective factors. In a study of physicians that reached the residency phase of their medical education, Wood et al. (2020), discovered that among protective factors to alleviate burnout include “grit, social support, psychological flexibility, and resiliency” (p. 284). Similarly, Ellinas and Ellinas (2020) compared these four protective factors to residents during a pandemic. Jumat et al. (2020) and Majeed et al. (2019) also agreed that students possessing grit are less likely to experience burnout and are better protected against depression and suicidality. While resilience is a factor that permits individuals to flourish in spite of challenges and drawbacks (Howe et al., 2012), students that have grit possess “passion and sustained persistence applied toward long-term achievement” (Jumat et al., 2020, p. 2). Duckworth (2019) presented the term as a way to indicate the potential success and also included perseverance and “sustained and focused application of talent over time” (p. 1087). Grit is also considered in the research as factor that protects students against suicidal ideation

(Blalock et al., 2015; Kleiman et al., 2013; Marie et al., 2019), which can be affect medical students (Coentre & Góis, 2018; Dyrbye et al., 2008; Schwenk et al., 2010). Ursua et al. (2021) asserted that grit can be the factor that may cause a medical student to thrive after admission as Stoeffel and Cain (2018) agreed that “sustained commitment toward completing a specific endeavor despite episodes of failure, setbacks, and adversity” are critical for academic success (p. 125). In addition to alleviating psychological, emotional and social challenges, it has been established that when medical students have a high amount of grit, this is indicative of better academic performance as “higher levels of grit have been associated with educational attainment, successful outcomes, and have predicted achievement beyond a person’s ability” (Miller-Matero et al., 2018, p. 109).

Sustainability in the midst of adversity is also connected to solid mental health and in addition to grit, the emphasis on psychological flexibility is key for the success and well-being of medical students (Kötter et al., 2019; Thuma et al., 2020). Psychological flexibility is defined as “the ability to cope with life challenges and take appropriate actions toward future goals while balancing internal turmoil such as self-doubts, fears, needs, and desires” (Ellinas & Ellinas, 2020, p. 292). While Wood et al. (2020) did not consider psychological flexibility as effective as grit in the midst of burnout, they described psychological flexibility as “temporarily disengaging from the stressful situation and taking on a new perspective” (p. 289). Some research has described this process as *mindfulness* (Erogul et al., 2014; Moir et al., 2016; Roberts & Danoff-Burg, 2010), which Erogul et al. (2014) also described as a “self-regulated attention characterized by nonjudgmental awareness and acceptance of internal and external stimuli” (p. 352).

Outram and Kelly (2014) recommended emphasizing suffering and teaching students how to manage their suffering in addition to the suffering of their patients. As a mode of managing

suffering and helping students cope, Delany et al. (2015) recommended adding elements of cognitive behavior therapy (CBT), an approach rooted in the belief that “cognitive processes affect feelings and behavior, can be monitored and altered and that desired behavior may be influenced through cognitive change” (p. 1307). Appropriate levels of self-esteem and the ability to improve or quickly recover after failure are also connected to the concept of grit (Ellinas & Ellinas, 2020). Prevalent in the research is the consensus that medical students who have low levels of stress have improved quality of life (Alkatheri et al., 2020; Caceres & Lizotte-Waniewski, 2021; Kotter et al., 2019; Thuma et al., 2020;), but emphasis is placed on “sustainable stress coping and good stress management skills” (Kötter et al., 2019 p. 5).

Resilience is often used interchangeably with grit but the research has made clear delineations between the two (Duckworth, 2019; Meyer et al., 2020; Stoffel & Cain, 2018). Stoffel and Cain (2018) described resilience as a trait that can predict overall well-being while grit indicates success that is academic or professional in spite of ability. Burgis-Kasthala et al. (2019) indicated that resilience helps to positively affects academic performance and alleviates stress among medical students and Haglund et al. (2009) confirmed that even during events that may lend to stress, for instance, “clinical rotations” and “trauma exposure” (p.258), students are resilient. As programs for resilience are incorporated in undergraduate health professions students (Delany et al., 2015), they are also implemented in the form of workshops and trainings for medical students for stress management (Dyrbye et al., 2017; Gheihman et al., 2021; Peng et al., 2014). These programs and interventions span continents considering similarities in approach among research involving medical students in the United States in addition to Brazil (De Oliveira et al., 2017), Malaysia (Francis et al., 2019) and China (Peng et al., 2014).

Dyrbye et al. (2017) incorporated fitness and aerobics training and compared medical students that exercised to those that did not. Gheihman et al. (2021) used 90-minute workshops engaged participants and “introduced the concept of everyday resilience,” teaching them “straightforward, skills-based resilience exercises that could be applied to their daily lives” (p. 8). Peng et al. (2014) considered the Penn Resilience Program, a training program created by researchers at the University of Pennsylvania with the intention of alleviating anxiety, stress, and positively affecting student well-being. Similar to Delany et al. (2015), the PRP uses cognitive behavioral therapy and examines resiliency before and after the training program. While Peng et al.’s study indicated that students’ stress levels decreased after use of PRP, Gheihman et al. (2021) found “no measurable improvements in medical student well-being or empathy” after considering stress management (p. 2). De Oliveira et al. (2017) considered a number of factors to measure resilience including gender, religion and alcohol or drug abuse. They assert that a major factor in determining resilience among medical students was their health and there was not any association with religion or income, while Francis et al. (2019) established that “religious coping” was a way to reduce stress and anxiety (p. 259). The authors differentiated between positive religious coping, which “translates to a secure relationship with God, and involves appraisal of obstacles in the light of God’s providence” and negative religious coping, which is harmful and “maladaptive and interprets challenges as a result of punishment and divine dissent” (Francis et al., 2019, p. 259).

The ultimate goal in resilience education is to produce physicians that have developed this critical trait, the adeptness to “respond to stress in a healthy way such that goals are achieved at a minimal psychological and physical cost” (Epstein & Krasner, 2013, p. 301). Emphasizing the importance of resilience as a key factor to the longevity and effectiveness of the medical school to physician pipeline, Epstein and Krasner (2013) attested to the importance of programs that

promote resilience specifically for medical students and those in other areas of the healthcare profession. The authors reference the importance of “clinician well-being” (p. 301), stating that for better hospitals, academic health sciences centers and other institutions of healthcare, clinician support is key.

Social support is prevalent in the literature as key to student success and achievement (Ellinas & Ellinas, 2020; Rospenda et al., 1994; Yamada et al., 2014). Ellinas and Ellinas (2020) referred to a 1983 study conducted by Cohen and Hoberman (1983) where the authors divide social support into three distinct categories: tangible, appraisal and belonging. While belonging support considers the “perception of fitting in,” (Cohen & Hoberman, 1983, p. 294), tangible support relates to physical presence and appraisal support “refers to one’s own estimate or emotional interpretation of social support” (p. 294). Yamada et al. (2014) indicated that “psychological distress and low peer social support were negatively associated with poor academic self-perception” (p. 1). This is significant with the literature on social support. Park et al. 2015 asserted that one of the coping mechanisms for stress is social support and Thompson et al. (2016) connected social support with resilience and “approach-oriented coping strategies,” (p. 176), which are defined as strategies that directly address or confront a stressor” (p. 176). These approach-oriented coping strategies include spending time with friends, “contacting a therapist or counselor,” “seeking support from a church or spiritual advisor,” and “being involved with faculty in designing and promoting programs” (Thompson et al., 2016, p. 176).

Conclusion

A review of the literature highlights the impact of academic medicine. The selection process for medical school hopefuls involves a review of the typical admissions requirements, grade point average and MCAT score, but also considers noncognitive factors like empathy,

compassion, critical thinking and resilience (Epstein & Krasner, 2013). The ability to “bounce back” or cope in the midst of trials (Duckworth, 2019; Meyer et al., 2020; Stoffel & Cain, 2018) is an element of medical education that enables students to succeed beyond the MCAT (Ellinas & Ellinas, 2020; Yamada et al., 2014). The knowledge of various protective factors provides medical school admissions committees with an indication of medical school candidate eligibility.

Understanding issues of risk and resilience and protective factors that aid in student success also provide medical school staff and faculty with resources to better support the total student, adopting a holistic approach with student support services (Rospenda et al., 1994; Yamada et al., 2014).

An assessment of the skills and competencies necessary for success speaks to traits like grit and interpersonal communication (Jewett et al, 1982; Langewitz, et al, 1998; Rider & Keefer, 2006; Serwint & Rutherford, 2000; Stoeffel & Cain, 2018; Ursua et al., 2021). Technical skills are referenced based on specialty and desired outcomes for residency program competencies (Chan et al., 2012; Nair, 2019; Wayne et al, 2006b). In spite of varying technical skills like pain management (Jones, 1996; Rosenzweig, 1991), the ability to revive an infant at the time of birth (Nadel et al., 2000), communication skills are a common competency across medical specialties (Jewett et al., 1982; Langewitz, et al., 1998; Rider & Keefer, 2006; Serwint & Rutherford, 2000).

The role of the admissions committee in the selection process is critical to shaping the culture of the institution and speaks volumes to what is necessary for students to prepare for medical school (Blakely & Broussard, 2003; Dowd et al., 2021; Epps, 2015; Hacker & Schafer, 1988; Jackson et al., 2003; McDougale et al., 2015). This preparation begins in undergraduate studies but for some students, it can begin as early as elementary school (Jacob, 2015; Zhao et al., 2013). The admissions process for medical school begins with a review of the medical school curriculum, its history and the history of academic medicine (Drake, 2014; Mullan, 2017). This

history cannot be discussed without addressing issues of bias, institutionalized racism, and eradicating health disparities in underrepresented communities (Barzansky & Gevitz, 1992; Drake, 2014; Duffy, 2011; Mullan, 2017; Savitt, 2006).

Additionally, barriers to medical education and barriers to receiving adequate medical care must be examined and mitigated (Baker, 2014; Baker et al., 2008). Medical school missions' statements and values are critical to the selection process, especially how and if the mission of the institution informs the selection of students (Campbell, 1997; Davis et al., 2007; Morpew & Hartley, 2006; Pearce & David, 1987). Elements of medical school missions include research, diversity and commitment to social mission and the healthcare landscape needs (Gbric, 2013; Hafferty et al., 2019). In addition to a public health crisis, the pandemic raised thought provoking questions about access, and the need for the health professions workforce to reflect patient diversity and culture, inclusive of language, ethnicity, race, gender, sexual orientation and other elements that speak to representation.

Chapter 3: Research Methods

Introduction

This chapter outlines the research methodology used in the study, examining critical competencies necessary for successful matriculation to medical school and future implications for physicians that will be prepared for practicing medicine. It is important to connect medical school acceptance and the potential for non-cognitive factors to predict student success. While research suggests MCAT performance implies success, there are considerations for students that apply to medical school and are admitted, equipped with other strengths beyond the MCAT (Dunleavy et al., 2013; Violato et al., 2020). Quantifying these students' experiences will inform premedical preparation and the admissions process for medical school consideration. In this chapter, the research design is outlined in addition to the participant selection process and the protection of human subjects. The processes for sampling and recruitment and instrument design is defined, in addition to the plan for data collection, statement of personal bias and lived experiences of the participants. This chapter also provides a comprehensive analysis of the data.

Restatement of the Research Question

Matriculation to medical school is increasingly competitive and with the growing number of medical school applicants (AAMC, 2021) medical school admissions committees are reflecting on alternative methods of narrowing down the search for the ideal first year medical school class. Additionally, as health professions advisors are providing guidance for prospective medical students on key factors to buttress their medical school application, medical school hopefuls are also evaluating their academic experiences and extracurricular activities in the anticipation of presenting a competitive application (Singer & Witzburg, 2007; Wagoner, 2006). In this study, the following research questions (RQ) were addressed:

- What are the critical skills, core competencies and training necessary for a pre-professional education that will lead to successful medical school matriculation?
- Can these critical skills, core competencies and training be incorporated in a theoretical framework that supports pre-professional education for medical school?

This study aims to consider the training necessary for successful medical students and if pre-professional programs are able to enhance any gaps or imbalances in learning. The purpose of this study is to examine the components of a pre-professional medical program that will lead to successful medical school matriculation and to assess if these components can be incorporated in a theoretical framework that supports pre-professional education.

Research Design

This study will employ a modified Delphi process in order to examine the proposed research questions by generating items through a review of the literature. The Delphi Method was named after a city referenced in Greek mythology that housed an oracle which was used to provide estimates or predictions (Sprenkle & Piercy, 2005). While this method has been employed to make forecasts about horse races and varying methods of family therapy, it is best known as developed by the RAND Corporation, a nonprofit organization based in Santa Monica, California recognized for research, policy and analysis (Jenkins & Smith, 1994; Sprenkle & Piercy, 2005; Winkle et al., 1981). The Delphi Method is typically applied when attempting to gain insight from subject matter experts from a three-part analysis of their responses, a thoughtful assessment and then ultimately seeking to gain consensus. The Delphi Method, not widely employed as other approaches (Brady, 2015), is a process used in qualitative research. Creswell and Poth (2016) referenced a definition of qualitative research from Denzin and Lincoln (2011), pioneers of qualitative inquiry: “a situated activity that locates the observer in the world” (p.3) consisting of

methods or practices that shed light on the world we live in through “field notes, interviews, conversations, photographs, recordings and memos to the self” (Creswell and Poth, 2016, p. 7).

Gordon (1994) described the Delphi Method as a debate that has a measure of control and represents the “synthesis of opinion” of a group of respondents (p. 4). Toepoel and Emerson (2017) asserted that “through an iterative procedure over several questionnaires” (p. 165), the respondents’ answers are compiled until a level of unanimity is reached. The Delphi process involves the following: (1) initial question, (2) selection of the panel of experts, (3) distribution of the questionnaire for the first round, (4) an analysis of the responses from the first round, (5) after providing opinions on the first round, formulating and then distributing the questionnaire for the second round, (6) analyzing the responses from the second round, (7) after providing opinions on the second round, formulating and then distributing the questionnaire for the second round, (8) analyzing the final results and providing them to the panel of experts (Gordon, 1994).

Delphi Method Advantages and Disadvantages

The Delphi Method has advantages in addition to disadvantages. Fink-Hafner et al. (2019) indicated that it limits in person meetings, lends to anonymity and limits expert cacophony as there are not group sessions or focus groups. Stitt-Gohdes and Crews (2004) agreed with the benefit of anonymity in that the panel of experts are able to share their perspectives without reservation or fear of judgment.

As far as weaknesses, Stitt-Gohdes and Crews (2004) emphasized that the Delphi process can be time consuming for respondents and it is critical for a researcher to consider the panel of experts as expert consultants and to compensate them for participating in the Delphi study. The authors also reference “sloppy execution” (p. 59) and attempting to rush the process as potential weaknesses.

Researchers consider it beneficial in that it reduces the potential for intimidation or influence and focuses on objectivity (Gordon, 1994; Sprenkle & Piercy, 2005). Gordon (1994) provided a weakness of the Delphi Method, describing that questions rooted in fact are not ideal and the time spent routing through the questionnaires can be consuming.

The Modified Delphi Method

A modified Delphi Method is deemed appropriate for this study. Green (2014) indicated that Delphi first appeared in higher education in the mid-1930s and has been used to establish “guidelines and standards” (p. 2) in addition to making projections about industry trends. Brady (2015) indicated that Delphi is beneficial for members of groups that are typically not included in traditional research that may be in a “lower power position,” asserting that Delphi permits contribution from participants in a way that minimizes “power dynamics while promoting participation” (p. 3).

This study focuses on the successful medical students and the positive noncognitive factors that prevailed in spite of academic, socioemotional or environmental challenges that would have otherwise labeled them at-risk. Similarly, Lambe and Bristow (2010) focused on which qualities are critical for good doctors. The authors focus on the Tooke Inquiry (Tooke, 2008), which was named from a report produced from Professor John Tooke in the United Kingdom, establishing a call to reform medical education (Delamothe, 2008; Eaton, 2007; Kmietowicz, 2008; Tooke, 2008). The attributes that were critical for physicians included integrity, empathy, honesty, good communication, sound coping skills, solid decision making, creativity, teamwork, curiosity, leadership and the ability to work well in high pressure situations (Lambe & Bristow, 2010). Similarly, the proposed study focused on critical competencies that make for successful medical students. Lambe and Bristow’s Delphi survey is a prime example of the success of the Delphi

method to the field of medical education, as the authors assert that the result of their findings could be used during the “undergraduate medical student selection process” (p. 353).

Participant Selection

The PI will search using a database that is publicly available, using the LinkedIn platform, organization or association pages or webpages that are publicly available. The analysis unit is an expert defined as a student, physician, resident or pre-health professions advisor. Special attention will be paid to health professions advisors, medical school faculty and staff and student services professionals that work with underrepresented communities as previously defined. These involve professionals that work with students underrepresented in medicine, including but not limited to, students that identify as female, members of the LGBTQ+ community, students from rural areas and students that identify as Black, Native American or Indigenous and/or Latino.

Exclusion and Inclusion Criteria

The criteria for exclusion involve individuals that are not in the medical field or familiar with the health professions admissions process. The PI will attempt to draw from a diverse group of experts in order to achieve maximum variation. The criteria for inclusion involved individuals with expertise in the medical school student selection process. These experts were defined as students that have been through the process, professors that teach in the process and staff that are engaged in supporting students during this process. The PI searched LinkedIn and other webpages that were publicly available using inclusion criteria to compose the master list which had 76 participants.

Applying exclusion criteria, the PI narrowed the list the list to 25 participants and sent the recruitment script to the final 25 study participants via email. The PI assessed the criteria for maximum variation paying close attention to diverse perspectives. Of the 50 initial participants, the

PI selected 25 participants to receive the informed consent form. The 25 participants received the first and second for a total of two questionnaires as outlined in the modified Delphi study. Eighteen participants responded to both questionnaires.

The participants were required to read the study recruitment email in its entirety and respond to the email, accepting the invitation to participate in the study. After the participant accepted and confirmed participation in the study, the PI obtained consent using this form (See Appendix C) through Qualtrics. It was required for participants to read and respond to the informed consent document.

Protection of Human Subjects

The IRB manual of Pepperdine University, which the Graduate School of Education and Psychology is in alignment with defines human subjects as “a living individual about whom an investigator conducting research obtains information....and uses, studies, or analyzes the information....or generates identifiable private information” (Pepperdine University, n.d., p. 10) Considering human subjects, this study involved a questionnaire or survey research and an adult population between the ages of 18-90 located throughout the world. The maximum number of subjects intended for this study was 50 and this study did not include any participants that identified as minors. Women and minorities were not excluded from this study and the study did not include any targeted subjects like employees supervised by the PI or employees from a single company. The subject population included participants that were current medical students or medical college graduates that were currently practicing physicians. Participants were not considered members of vulnerable populations. The modified Delphi study generated items from a review of the literature as participants will consider *motivation*, *grit*, *resilience* and other factors.

After the instrument was constructed, two people conducted a thorough review to ensure the items used were clear to understand and their definitions were consistent.

There is no greater than minimal risk for the participants in this study. The participant may run the risk of experiencing boredom, discomfort or fatigue with the questions asked or with the exact overall question topic. If the participant experiences any of these feelings, they can pause responding to the questions or completely stop. The PI aims to ensure all documents related to the study remain confidential, but there is always a potential for a breach in security or in data. Participation in this research study is voluntary. The participant was informed in the consent form that they were able to stop in the completion of the questionnaire at any time and for any reason without any consequence or impact. Additionally, the PI took the following steps to minimize risk in the event of a security or confidentiality breach including obtaining signed, informed consent with the participants' signature kept separately from the questionnaire. This questionnaire was deidentified using a pseudonym before the analysis which added an additional security tier to the study's process. The questionnaire, informed consent, along with all of the data will be kept on a computer that is password-protected in a folder that is also protected by a password. All of the data will be destroyed within 3 years of study completion.

While this study does not possess any benefits to the participants, there may be potential benefits that could possibly have an impact on society in addition to areas of education and business by providing understanding to challenges, success strategies and any benchmarks leaders could potentially face in their field of expertise. Additionally, this study's findings can provide an opportunity for future ongoing opportunities for research, development, understanding, and training in the respective areas. The alternative is for participants not to participate in this study as they may opt-out at any time and for any reason without impact or repercussion.

Sampling and Recruitment

The PI collected names and email addresses of each participant in order to determine eligibility for the study. Participants were invited via email and could participate virtually at their ideal time and location. Participants were asked to review and respond to the informed consent form, sign the form and return it to the PI with the first and second questionnaire with each questionnaire taking 30 minutes to complete. After IRB approval, the PI developed a master list using purposive sampling using the unit of analysis in order to determine the master list target audience.

Participants were responsible for reading the two questionnaires in the modified Delphi study and providing responses to the questions. Participants were compensated for participating by gift cards for each questionnaire. Gift cards were sent via email to maintain anonymity. The PI covered all study related costs including providing funding for the gift cards and the study will last approximately a year from the beginning until publication.

All risks and benefits were included in the Informed Consent form by the PI and participants were notified that they were able to halt participation at any time in the process. All data will be kept on secure networks that are password protected and any data collected will be kept in alignment with strict confidentiality protocols. While both the admissions data and the academic record are confidential, there is no more than minimal risk involved with this study. Possible risks include participants feeling boredom, discomfort or fatigue with the questions and there is potential risk of a breach of data security. If there is a breach in confidentiality, the PI will take special precautions in order to minimize risk if there should be a breach in confidentiality. All consent forms were signed by participants and will be kept separate from the questionnaire or

survey. Any data analysis from the survey will be kept separate from the consent forms and questionnaire.

Participant responses were maintained in alignment with stringent guidelines relating to confidentiality. Research study participation is voluntary and participants were notified in the consent form that they are permitted to withdraw from participation at any time during the study.

Participants could stop completing the questionnaire at any time during the process and the questionnaire would have been deidentified in advance of the analysis by the PI and research team. The PI received the signed consent forms with the participant signature and these informed consent forms were separated from the questionnaire and survey in addition to separate from any data analysis spreadsheets or tools. The data involved in the research will be kept on secure networks that require password access. While research study material such as the questionnaire and informed consent form will be kept separated in different password protected folders on a password protected computer, all of the data related to the study will be destroyed within 3 years of the completion of the study.

There is no potential conflict of interest for the study and regarding HIPPA regulations, health information will not be accessed, received or collected.

Instrument Design

A questionnaire was employed for this study (See Appendix B), using an “anonymous orderly program of sequential individual” mode of questioning in order to control the feedback from participants and “elicit and refine group judgments where exact knowledge is unavailable” (Brown et al., 1969, p. 1). The PI analyzed the data from the questionnaire, considering areas where participants had commonalities or shared experiences. The questionnaire solicited participant feedback using a 7-point Likert scale indicating responses to the following: Very

Important, Important, Somewhat Important, Neutral, Somewhat Unimportant, Unimportant, Very Unimportant.

There are advantages and disadvantages to using the Likert scale which, as Kandasamy et al. (2020) asserted, is the most “widely used psychometric scale for obtaining feedback” (p. 7459). Nemoto and Beglar (2014) indicated that Likert scales enable the researcher to collect data in an efficient way even with many respondents and Desai and Costa (2021) referenced that the scale is flexible in nature. Bertram (2007) asserted that Likert scales are easy to establish but also references some weaknesses including the self-reported nature of the scale where respondents may attempt to pacify the PI or show themselves in a light that is more favorable in lieu of honesty. Agree reflects that there is not a way to discern or tell a major difference between “strongly agree and agree” or “agree and undecided” or neutral (Edmondson, 2005, p. 129).

Data Collection

In order to garner participation for this panel, a letter (See Appendix A) was generated outlining the details and purpose of the study, the Delphi process, in addition to the participation requirements for eligibility. This letter was posted in central locations and high traffic areas of the medical schools in the southeast region in addition to online messaging boards frequented by medical students and professional networking websites such as LinkedIn. This letter invited participants that had the eligibility requirements to complete the first questionnaire in the first round of the Delphi Method (See Appendix B) after acknowledging, signing and returning to the primary investigator (PI) the informed consent form (See Appendix C).

This study employed a mixed methods design using a Delphi study. Data analysis was performed of the questionnaire responses and the participants will employ descriptive statistics using the median, mode and interquartile ranges. The PI provided a recruitment script on publicly

available websites such as LinkedIn and medical student list serves in addition to medical schools and academic health science centers, especially those that may have a postbaccalaureate program, around the country. To complete the data analysis, the PI entered participant responses into an Excel spreadsheet, evaluated the item stability for the first cycle and then ultimately determined cycle consensus, sending the questionnaire back to the participants including the items that did not reach consensus. This process was repeated for the second cycle and a third cycle was not necessary. The PI determined the final consensus using the collated items from two cycles.

Statement of Personal Bias and Lived Experiences

Pannucci and Wilkins (2010) defined bias as “any tendency which prevents unprejudiced consideration of a question” (p. 619). Fraizer (2009) described bias as “epoche” which is a reference from Moustakas (1994) who describes epoche as “one’s own insights and perceptions of the phenomenon being investigated” (p. 77). It is critical for bias to be established at the beginning of a research study as this prevents any prejudgment or preconceived notion. Pannucci and Wilkins described that bias can occur at various stages of a research study from planning and implementation through data analysis and publication. The PI for this study is not a medical student or medical school graduate but works in enrollment management and college admissions. She has seen many students that were considered inadmissible that ended up shaping the culture of the institution as students and becoming dedicated alumni; conversely, she has seen top admissions prospects matriculate and not excel according to predictive validity. Her affinity towards “diamond in the rough” students is evident as they are the subject of this study. She hoped to shed light on a group that is usually disfavored in the literature because of their negative academic experience as she chooses to focus on positive traits that enable them to succeed in spite of struggle. Fraizer (2009) described epoche highlighting the importance of recalling “meaningful personal

experiences that were related to the phenomenon being investigated” and then bracketing these experiences by reflecting on memories of the personal experiences until a feeling of closure is felt (p. 79).

Data Analysis

Coding during the Delphi Method allows collaboration without the convolution of the influence of others (Sharkey & Sharples, 2001). The PI was able to gain insight from participants individually about the same themes without them being swayed or controlled by the other. After generating a list of key items from an extensive search of the literature, the PI selected the panel of experts. During round one, the first round Delphi instrument was distributed to the respondents in a survey template in a 7-point Likert scale (see Appendix B). During the process, the questionnaires were considered on an individual basis and similar points and phrases were analyzed as important concepts are drawn from.

The PI employed a four-step process in order to ensure that Interrater Reliability is obtained. Interrater Reliability occurs when “multiple coders are used to make decisions at various points in the screening and data extraction stages of a study” (Belur et al., 2021, p. 837). This ensures that at both coding and screening stages, data clarity and data consistency is maintained. Interrater reliability was achieved. After the first round of data is collected, the PI calculated Median, Mode, and Interquartile Range (IQR) IQR for each item and items with an QR that is greater than 20% reached consensus and achieved item stability. The PI prepared a summary of the first round by indicating the number of items in the first questionnaire and the percentage of stable and unstable items in graph form.

For Round 2, the PI created the instrument after removing all of the items that have reached consensus. For the items that remained, the group median score was added. After Round 2

data was collected and Median, Mode and IQR for each item were calculated, the PI checked for item stability and determined which items have reached consensus based on a IQR that is greater than 20%. Final consensus was achieved because more than 85% of the items on the questionnaire from Round 1 and Round 2 are stable. For the remaining items, the group median score was added and Round 3 data was collected. Median, Mode and IQR were calculated for each item and item stability was assessed. The remaining items that were considered unstable were calculated and confirmed that final consensus was reached and any item that did not reached stability were sorted and discussed accordingly. The findings from the modified Delphi process were summarized and a theoretical model was developed using a coding process.

The PI made an assessment for final consensus. Final consensus was achieved as more than 85% of all of the items on the instrument, inclusive of those from Round 1, have reached stability. Lincoln and Guba (1985) and Lub (2015) indicated that triangulations occur when those that are conducting research draw from various information sources to support their conclusions.

Consensus is achieved if the following occurs:

If less than 10% of the items do not indicate any variation from the median value from earlier rounds. This means that the median from the round before will be subtracted from the mode rating in the prior round. If the difference is zero, this will imply the median saw no change. Stability is achieved if 85% or greater than the items are considered and if this occurs for all of the study's items, consensus will be achieved which is known as the Median Consensus Index or MECI.

If less than 10% of the items do not indicate any variation from the mode value from earlier rounds. This means that the mode from the round before will be subtracted from the mode rating in the prior round. If the difference is zero, this will imply the mode saw no change. Stability is

achieved if 85% or greater than the items are considered and if this occurs for all of the study's items, consensus will be achieved which is known as the Modal Consensus Index or MOCI.

If less than 10% of the items do not indicate any variation from the IQR value from earlier rounds. This means that the IQR from the round before will be subtracted from the IQR rating in the prior round. If the difference is zero, this will imply the IQR saw no change. Stability is achieved if 85% or greater than the items are considered and if this occurs for all of the study's items, consensus is achieved which is known as the IQR Consensus Index or IQRCI.

As outlined above, final consensus was attained and the items that achieved consensus were calculated from highest to lowest based on Median, Mode and IQR.

After the PI received the first 2 questionnaires, the PI analyzed and coded the content, arriving at key concepts for each research question. The PI's findings, including the questionnaire, codes and concepts, were shared with two co-raters, who reviewed and discussed with the PI. The co-raters were members of a peer review committee and in addition to upholding confidentiality and abiding by the regulations set forth in IRB, they were qualified to analyze the data.

Possibilities from this process included the co-rater providing recommendations for adjusting the concepts or codes initially discovered by the PI. The PI and co-raters worked toward consensus, and a dissertation committee member provided a ruling on any area where the PI and co-raters differ. After consensus was established, the PI coded the remaining questionnaires, abiding by the same process employed by the first the questionnaires. Finally, the PI acquired consensus with the co-raters, as stated previously, with the remaining questionnaires.

For the qualitative portion of this study under research questions 2, content analysis was conducted. The PI employed a four-step process in order to ensure that Interrater Reliability was obtained. Interrater Reliability occurs when "multiple coders are used to make decisions at various

points in the screening and data extraction stages of a study” (Belur et al., 2021, p. 837). This ensures that at both coding and screening stages, data clarity and data consistency is maintained. Interrater reliability will be achieved. The purpose of the four-step process is for the PI to achieve Interrater Reliability. The PI started the coding process and there are three types of coding. A structured interview relies on specific “predefined questions” limiting the possibility of asking the participant follow up questions or questions for clarification (Zhang & Wildemuth, 2009, p. 229). Unstructured coding is defined as a narrative approach where the participant has control over the process, providing open-ended responses that are detailed (Corbin & Morse, 2003; Saks & Allsop, 2021). Semi structured differs in that while the participant responses are detailed, the PI or researcher uses the responses to frame the interview and “provides the topic while remaining responsive to the participant” (McIntosh & Morse, 2015, p. 1). This study employs unstructured coding which will use the participants responses to the questions and permits follow up questions based on their responses (Young et al., 2018.)

Data was coded based on the inductive coding process which starts with a close examination of language and considers other possible definitions (Thomas, 2003). This process involves: a) preparing and formatting the raw data files, b) conducting a close read of the text, c) establishing categories and identifying themes, d) discovering instances where the coded texts may overlap with the uncoded text, e) a continuation of the system of revising within the categories (Thomas, 2003).

Thomas (2003) described raw data file preparation as *data cleaning* or compiling the data files and ensuring that the format is uniform. This may involve making backup copies of the data files and questionnaires and making the files into a format that is similar, including the same size, font and considering if any participant comments were similar.

A close reading of the text enables the PI to be so familiar with the material that the next step of category creation can begin (Thomas, 2003). In this third step, themes or categories are developed based on the questionnaire responses of participants. Thomas (2003) described dividing categories from “actual phrases or meanings in specific text segments” (p. 241) and using multiple categories to group participant responses into themes. From creating categories, the researcher will determine if a particular word or phrase belongs in more than one category (Thomas, 2003). This process of overlapping coding and uncoded text may also involve excluding some words or phrases if they do not need to be included at all because they are not relevant to the research study and the research questions. Thomas described a continual process of refining and revising the categories that have been established by the PI. This captures the essence of the data coding process, examining the words and phrases from the participants and drawing comparisons between similarities. As validity is defined as the “degree to which a result from a study is likely to be true and free from bias” external validity occurs outside of the study and is describes if there is “variation in persons and measurement variables” (Khorsan & Crawford, 2014, p. 2).

Summary

Chapter 3 outlines the study of participants and research methodology used when examining competencies required for successful medical school matriculation. The following competencies have been drawn from the literature to inform the item list for the participants consideration including the following:

- Grit (Duckworth, 2019)
- Above Average GPA (Gay et al., 2018)
- Critical Thinking (Epstein & Krasner, 2013).
- Resilience (Howe et al., 2012; Thompson et al., 2016)

- Above Average MCAT Score (Gay et al, 2018)
- Pre-Professional Program Participation (DiMola & Lowe, 2017; Romero et al., 2020)
- Test Preparation/Test Anxiety Mitigation Strategies (Green et al., 2016; Paul et al., 2013)
- Empathy (Park et al., 2015)
- Interpersonal Communication Skills (Jokinen, 2005)
- Compassion (Patel et al., 2019; Reiss, 2017)
- Cultural Competency (Loue et al., 2015; Quince et al., 2014; Swick et al., 1999)
- Crisis Management (Efsthathiou Panos et al., 2009)
- Research Experience (Dong et al., 2012)
- Stress Management Skills (Gheihman et al., 2021; Peng et al., 2014)
- Service and Social Mission Oriented (Grbic et al., 2013; Mullan et al., 2010; Mullan, 2017)
- Commitment to Medical Ethics (Dudzinski, 2004)
- Conflict Management Skills (Chan et al., 2012)
- Professionalism (Klemenc-Ketis, Z., & Kersnik, J., 2011; Wagoner, 2006)
- Perseverance (Duckworth, 2019)
- Psychological Flexibility (Ellinas & Ellinas, 2020)
- Coping Skills (Shatkin et al., 2016)
- Social Support (Rospenda et al., 1994; Yamada et al., 2014)
- Religion/Spirituality (Estupiñan & Kibble, 2018)
- Integrity (Husbands et al., 2015; Jensen, 2009)

- Healthy Self-Esteem (Ellinas & Ellinas, 2020)
- Basic Science Undergraduate Curriculum (Emanuel, 2006)
- Strong Writing Skills (Hojat et al., 2000)
- Shadowing Experience (Kitsis & Goldsammler, 2013)
- Dedication (Cooper et al., 2019)

As medical school admissions committees refine the admissions process to consider multiple elements of a candidate's application, participant data can be used to inform the admissions process and to strengthen current medical school curriculum. The research examines the training and skills critical for pre-professional medical education and considers if these skills can be incorporated into a curriculum or framework. Using a Delphi process, the PI attempts to gain interrater reliability among a select group of participants. The Delphi process, a method of qualitative research, is ideal for this study as it will lend to confidentiality and will limit power dynamics (Brady, 2015).

The participants were asked questions using a questionnaire or survey, assessed on a seven-point Likert scale, about their experiences that led them to medical school and their preparedness for coursework or their ability to prepare students for medical school. The participants were notified of this study through a letter that provided details highlighting the purpose of the study and any requirements to participate. Participants signed an informed consent form in addition to fulfilling eligibility requirements of the study, which includes pre-health professions advisors, medical school faculty or staff, and/or student affairs staff in a hospital or academic health science center. While there is minimal bias for this study, the multiple coding process and interrater reliability ensured the data is consistent and sound analysis occurs.

Chapter 4: Findings

In this chapter, the results of the study are presented inclusive of a summary of the data collected during each phase of the study. In addition to demography of the participants in the study, data analysis for each phase is presented and summarized.

Recruitment of Participants

The process for selecting participants for this study began by assessing experts in the medical field, including but not limited to medical residents, academic advisors, pre-health advisors, pre-medical advisors, medical school faculty and directors of pre-health professions programs at colleges and universities. Eligible participants included currently enrolled medical students, medical school graduates in residency or awaiting a residency placement, residency program graduates currently enrolled in an academic health science center, medical center or hospital, pre-health professions advisors for undergraduate or graduate students, and/or medical school faculty and administrators.

Seventy-six participants were contacted by email with details of the study including the study's benefits and purpose, explanation of the Delphi Method, and required time commitment for three rounds of questionnaires (See Appendix A). Participants were provided with a link to the survey which included an informed consent form highlighting key information about the study, participant eligibility, and possible benefits and risks (See Appendix B). The initial 29 item questionnaire (See Appendix C) was provided to the participants including a place to provide name and email address only for compensation purposes. This contact information is only to provide the participant with the electronic gift card which was provided to those who that completed the survey rounds of the Delphi Method.

Eighteen participants responded to the questionnaire and participation request reflecting an 18.4% response rate. A few participants reached out with preliminary questions about the study and the Delphi process and these questions were addressed via email.

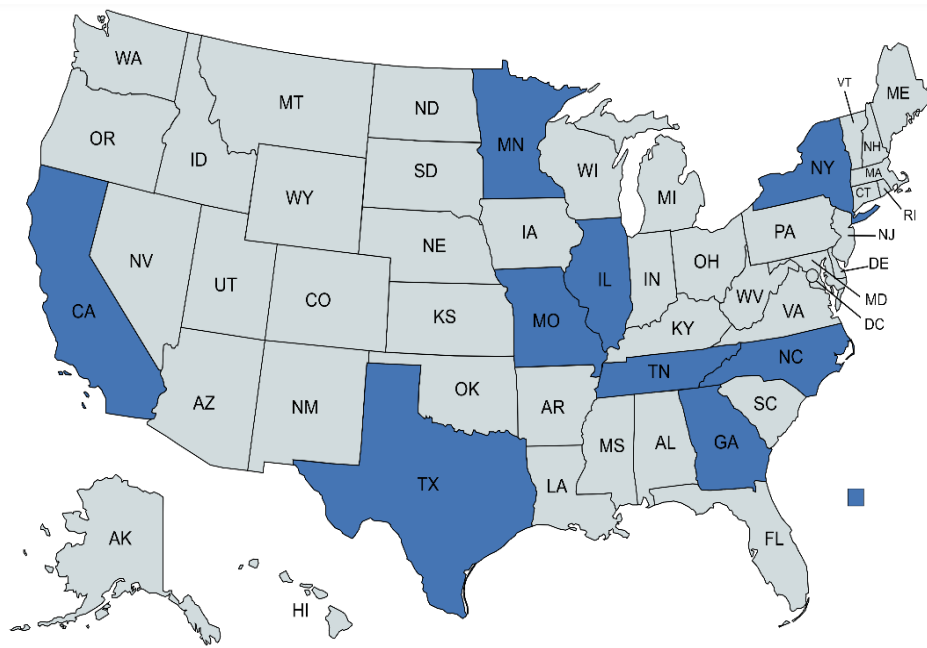
Characteristics of Eligible Participants

The survey respondents met all eligibility requirements and represented nine states (See Figure 1), including the following regions:

- West Coast
- Midwest
- Southeast
- Northeast
- Mid-Atlantic

Figure 1

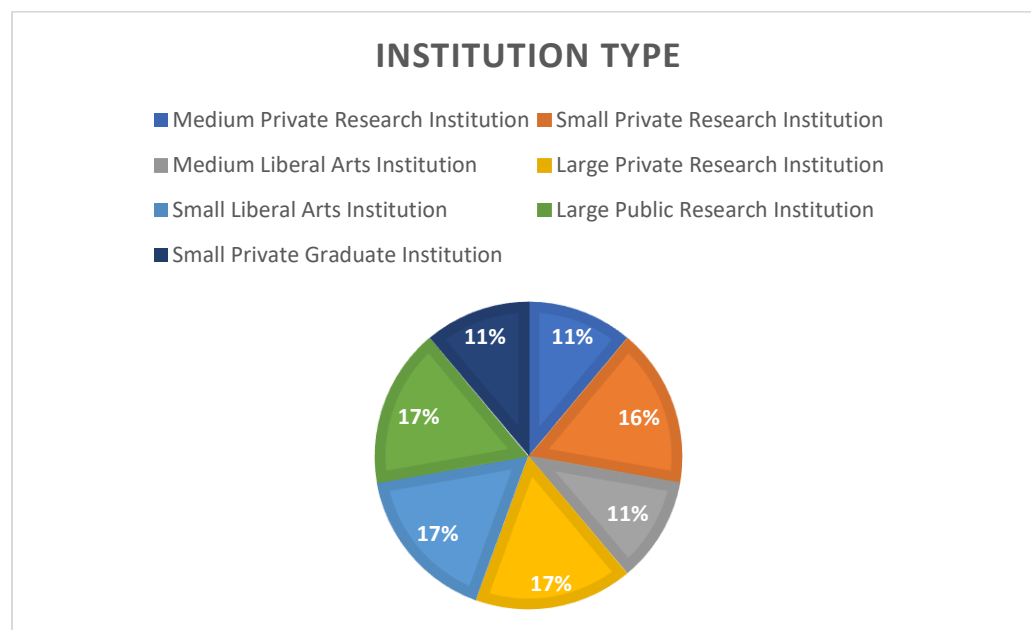
Geographic Location of Survey Respondents



Participants included medical school faculty, medical school administrators, pre-health advisors, pre-medical advisors and were from institutions varying in size, from small liberal arts college to large public university (Figure 2).

Figure 2

Study Participants and Institution Attributes/Characteristics



The participants were diverse in demography and in addition to location, campus climate and environment. As far as population, the participants had experience advising and teaching undergraduate and graduate students who were from diverse backgrounds including but not limited to:

- Students from rural areas
- Students from disadvantaged backgrounds
- Students underrepresented in medicine
- First generation students

- Non-traditional students
- Second or third generation college students (Williams, 2009)

The participants also represented diverse backgrounds as their areas of expertise included the following fields:

- Student Success
- Law
- Ethics
- Pre-Health Advisement
- Biomedical Sciences
- Physics
- Student Engagement
- Neuroscience
- Management
- Genetics
- Student Advisement
- Post-Baccalaureate Programs
- Microbiology
- Higher Education
- Plant Ecology
- Career Counseling
- Admissions/Recruitment
- Public Health

Data Collection

The researcher sent out 76 instruments including follow up and 18 responded to the first survey. The instrument was revised by adding the group assessment to the items and then the second round was sent out. The research questions previously stated were:

- RQ1: What are the critical skills, core competencies and training necessary for a pre-professional education that will lead to successful medical school matriculation?
- RQ2: Can these critical skills, core competencies and training be incorporated in a theoretical framework that supports pre-professional education for medical school?

To address these questions, a Delphi study was conducted examining 29 items. Of the 29 items reviewed by the panel of experts, 20 reached consensus (Table 3). This is calculated by an IQR less than or equal to 15% of scale range (7-point scale \times 15% = 1.05-rounded to 1). As far as a stability analysis, consensus in degree of importance of each item was reached among approximately 69% of the items. Stability is reached when consensus exists among 85% or more of the items.

Phase One Results

The researcher began the process by acknowledging the participants through the informed consent form. The researcher identified experts using LinkedIn and other websites searching for those that were involved in the health professions. Each expert signed a consent form and completed the survey in its entirety. Twenty-nine items were sent initially in the first round (See Table 1) and sixteen items reached consensus including the following:

- Resilience

- Integrity
- Above Average GPA
- Critical Thinking Skills
- Interpersonal Communication Skills
- Compassion
- Cultural Competency
- Crisis Management Skills
- Stress Management Skills
- Commitment to Medical Ethics
- Empathy
- Professionalism
- Perseverance
- Psychological Flexibility
- Coping Skills
- Social Support
- Basic Science Undergraduate Curriculum
- Strong Writing Skills
- Shadowing Experience
- Dedication

For the first two rounds, participants were given a week to provide responses. The panel of experts considered each item and rated the item based on its level of importance focusing on the competencies necessary.

Table 1

Round 1: Summary of Responses Sorted by the Degree of Consensus (n = 18)

Item #	Item Short Description	Median	Mode	IQR	Decision (IQR≤1)
1	Resilience	7.00	7.00	0.00	Consensus
2	Integrity	7.00	7.00	0.00	Consensus
3	Above Average GPA	6.00	5.00	1.00	Consensus
4	Critical Thinking Skills	7.00	7.00	1.00	Consensus
5	Interpersonal Communication Skills	7.00	7.00	1.00	Consensus
6	Compassion	7.00	7.00	1.00	Consensus
7	Cultural Competency	7.00	7.00	1.00	Consensus
8	Crisis Management Skills	7.00	7.00	1.00	Consensus
9	Stress Management Skills	6.50	7.00	1.00	Consensus
10	Commitment to Medical Ethics	7.00	7.00	1.00	Consensus
11	Empathy	7.00	7.00	1.00	Consensus
12	Professionalism	7.00	7.00	1.00	Consensus
13	Perseverance	7.00	7.00	1.00	Consensus
14	Psychological Flexibility	6.00	7.00	1.00	Consensus
15	Coping Skills	7.00	7.00	1.00	Consensus

Item #	Item Short Description	Median	Mode	IQR	Decision (IQR≤1)
16	Social Support	6.00	6.00	1.00	Consensus
17	Basic Science Undergraduate Curriculum	6.00	7.00	1.00	Consensus
18	Strong Writing Skills	6.00	6.00	1.00	Consensus
19	Shadowing Experience	6.00	6.00	1.00	Consensus
20	Dedication	7.00	7.00	1.00	Consensus
21	Above Average MCAT Score	5.00	6.00	2.00	No Consensus
22	Pre-Professional Program Participation	5.00	5.00	2.00	No Consensus
23	Test Preparation /Test Anxiety Mitigation Strategies	5.00	5.00	2.00	No Consensus
24	Service and Social Mission Oriented	6.00	6.00	2.00	No Consensus
25	Conflict Management Skills	6.00	7.00	2.00	No Consensus
26	Healthy Self-Esteem	6.00	6.00	2.00	No Consensus
27	Grit	7.00	7.00	2.00	No Consensus
28	Research Experience	4.00	6.00	3.00	No Consensus

Item #	Item Short Description	Median	Mode	IQR	Decision (IQR≤1)
29	Religion/Spirituality	4.00	4.00	4.00	No Consensus

The items that were the strongest, which are defined as items that reached consensus with an IQR of less than or equal to 1, included the following:

- Resilience
- Integrity
- Above Average GPA
- Critical Thinking Skills
- Interpersonal Communication Skills
- Compassion
- Cultural Competency
- Crisis Management Skills
- Stress Management Skills
- Commitment to Medical Ethics
- Empathy
- Professionalism
- Perseverance
- Psychological Flexibility
- Coping Skills
- Social Support
- Basic Science Undergraduate Curriculum
- Strong Writing Skills

- Shadowing Experience
- Dedication

The items that were the weakest, which are defined as items that reached consensus with an IQR of greater than 1, included:

- Above Average MCAT Score
- Pre-Professional Program Participation
- Test Preparation/Test Anxiety Mitigation Strategies
- Service and Social Mission Oriented
- Conflict Management Skills
- Healthy Self-Esteem
- Grit
- Research Experience
- Religion/Spirituality

Table 2 reflects the items from round 1 that reached consensus ranked by degree of importance among the items with consensus among the panel of experts. Resilience and integrity had the highest median and mode with the lowest IQR. The remaining items had an IQR of 1.00 but a median and mode of 7.00:

- Critical Thinking Skills
- Interpersonal Communication Skills
- Compassion
- Cultural Competency
- Crisis Management Skills
- Commitment to Medical Ethics

- Empathy
- Professionalism
- Perseverance
- Coping Skills
- Dedication

Table 2

Round 1: Summary of Responses – Degree of Importance Among Items With Consensus Among the Panel of Experts (n = 23)

Item #	Item Short Description	Median	Mode	IQR	Decision (IQR ≤ 1)
1	Resilience	7.00	7.00	0.00	Consensus
2	Integrity	7.00	7.00	0.00	Consensus
3	Above Average GPA	6.00	5.00	1.00	Consensus
4	Critical Thinking Skills	7.00	7.00	1.00	Consensus
5	Interpersonal Communication Skills	7.00	7.00	1.00	Consensus
6	Compassion	7.00	7.00	1.00	Consensus
7	Cultural Competency	7.00	7.00	1.00	Consensus
8	Crisis Management Skills	7.00	7.00	1.00	Consensus
9	Stress Management Skills	6.50	7.00	1.00	Consensus
10	Commitment to Medical Ethics	7.00	7.00	1.00	Consensus
11	Empathy	7.00	7.00	1.00	Consensus
12	Professionalism	7.00	7.00	1.00	Consensus

Item #	Item Short Description	Median	Mode	IQR	Decision (IQR<=1)
13	Perseverance	7.00	7.00	1.00	Consensus
14	Psychological Flexibility	6.00	7.00	1.00	Consensus
15	Coping Skills	7.00	7.00	1.00	Consensus
16	Social Support	6.00	6.00	1.00	Consensus
17	Basic Science Undergraduate Curriculum	6.00	7.00	1.00	Consensus
18	Strong Writing Skills	6.00	6.00	1.00	Consensus
19	Shadowing Experience	6.00	6.00	1.00	Consensus
20	Dedication	7.00	7.00	1.00	Consensus

Table 3 reflects a summary of the participants' responses in order of degree of consensus. Healthy Self-Esteem had the highest median and mode with the lowest IQR. The remaining items had an IQR of 1.00 and a median and mode below 6.00 with Grit being the only exception with a median and mode of 7.00:

- Healthy Self-Esteem
- Test Preparation/Test Anxiety Mitigation Strategies
- Research Experience
- Service and Social Mission Oriented
- Conflict Management Skills
- Grit

There were three items with an IQR of 1.75, 2, and 3 respectively that did not reach consensus:

- Above Average MCAT Score

- Pre-Professional Program Participation
- Religion/Spirituality

Table 3

Round 1: Summary of Responses Sorted by the Degree of Consensus (n = 18)

Item #	Item Description	Short	Median	Mode	IQR	Decision
1	Healthy Self-Esteem		6	6	0.75	Consensus
2	Test Preparation/Test Anxiety Mitigation Strategies		6	5	1	Consensus
3	Research Experience		4	4	1	Consensus
4	Service and Social Mission Oriented		6	7	1	Consensus
5	Conflict Management Skills		6	6	1	Consensus
6	Grit		7	7	1	Consensus
7	Above Average MCAT Score		5	5	1.75	No Consensus
8	Pre-Professional Program Participation		5	6	2	No Consensus
9	Religion/Spirituality		4	4	3	No Consensus

Table 3 reflects a summary of the responses ranked by degree of importance among items with consensus among the panel of experts. Healthy Self-Esteem had the highest median and mode with the lowest IQR. The remaining items had an IQR of 1.00 and a median and mode below 6.00 with Grit being the only exception with a median and mode of 7.00:

- Grit
- Healthy Self-Esteem
- Test Preparation/Test Anxiety Mitigation Strategies

- Service and Social Mission Oriented
- Conflict Management Skills
- Research Experience

Phase Two Results

A second round was needed as consensus was not reached with more 85% of the items. For the second round, the items that did not reach consensus in the first round, reflected in Table 4, were sent to the panel of experts for another review process. The items that did not reach consensus were:

- Grit
- Healthy Self- Esteem
- Test Preparation/Test Anxiety Mitigation Strategies
- Service and Social Mission Oriented
- Conflict Management Skills
- Research Experience

In addition to sending a second round of survey items, the researcher also included an open-ended question asking experts if there were additional items that would be beneficial to this study. These findings will be discussed in Chapter 5.

Twenty-six of the 29 items had reached consensus. This indicates that consensus in degree of importance of the item was reached among approximately 89.7% of the items. Stability is reached when consensus occurs among 85% or more of the items. As such, the Delphi has reached stability and no additional rounds are required. To confirm these findings, as stated in Chapter 3, three additional indices for stability were calculated. The Median Stability Index (MeSI), the percentage of remaining items for which the median changed from round 1 to round 2, was

13.79%. Interquartile Range Stability Index (IQRSI), the percentage of remaining items for which the Interquartile Range changed from round 1 to round 2, was 6.9%. Finally, the third stability index, Modal Stability Index (MoSI), the percentage of the remaining items for which the mode changed from round 1 to round 2, was 3.45%. All three of these items are below the 15% prescribed threshold for study stability, confirming that the Delphi study had reached Stability.

Table 4

Round 2: Summary of Responses – Degree of Importance Among Items With Consensus Among the Panel of Experts (n = 14)

Item #	Item Description	Short	Median	Mode	IQR	Decision
1	Grit		7	7	1	Consensus
2	Healthy Self- Esteem		6	6	0.75	Consensus
3	Test Preparation/Test Anxiety Mitigation Strategies		6	5	1	Consensus
4	Service and Social Mission Oriented		6	7	1	Consensus
5	Conflict Management Skills		6	6	1	Consensus
6	Research Experience		4	4	1	Consensus

Table 5 presents all 26 items for which consensus was reached among the Panel of Experts, sorted by degree of importance and degree of consensus.

Table 5

Summary of Responses – Degree of Importance Among Items With Consensus Among the Panel of Experts (n = 26)

Item No.	Item Short Description	Median	Mode	IQR	Decision (IQR≤1)
1	Resilience	7.00	7.00	0.00	Consensus
2	Integrity	7.00	7.00	0.00	Consensus
4	Critical Thinking Skills	7.00	7.00	1.00	Consensus
5	Interpersonal Communication Skills	7.00	7.00	1.00	Consensus
6	Compassion	7.00	7.00	1.00	Consensus
7	Cultural Competency	7.00	7.00	1.00	Consensus
8	Crisis Management Skills	7.00	7.00	1.00	Consensus
10	Commitment to Medical Ethics	7.00	7.00	1.00	Consensus
11	Empathy	7.00	7.00	1.00	Consensus
12	Professionalism	7.00	7.00	1.00	Consensus
13	Perseverance	7.00	7.00	1.00	Consensus
15	Coping Skills	7.00	7.00	1.00	Consensus
20	Dedication	7.00	7.00	1.00	Consensus
21	Grit	7.00	7.00	1.00	Consensus
9	Stress Management Skills	6.50	7.00	1.00	Consensus
22	Healthy Self- Esteem	6.00	6.00	0.75	Consensus
3	Above Average GPA	6.00	5.00	1.00	Consensus
14	Psychological Flexibility	6.00	7.00	1.00	Consensus

Item No.	Item Short Description	Median	Mode	IQR	Decision (IQR≤1)
16	Social Support	6.00	6.00	1.00	Consensus
17	Basic Science Undergraduate Curriculum	6.00	7.00	1.00	Consensus
18	Strong Writing Skills	6.00	6.00	1.00	Consensus
19	Shadowing Experience	6.00	6.00	1.00	Consensus
23	Test Preparation/Test Anxiety Mitigation Strategies	6.00	5.00	1.00	Consensus
24	Service and Social Mission Oriented	6.00	7.00	1.00	Consensus
25	Conflict Management Skills	6.00	6.00	1.00	Consensus
26	Research Experience	4.00	4.00	1.00	Consensus

After two rounds, Table 6 represents the items that did not reach consensus. The panel of experts did not reach consensus for the following three items:

Table 6

Summary of Responses – Items that did not Reach Consensus

Item #	Item Short Description	Median	Mode	IQR	Decision
1	Religion/Spirituality	4	4	3	No Consensus
2	Above Average MCAT Score	5	5	1.75	No Consensus
3	Pre-Professional Program Participation	5	6	2	No Consensus

Final Results

The 29 items were considered and 26 items reached consensus including the following:

- Resilience

- Integrity
- Critical Thinking Skills
- Interpersonal Communication Skills
- Compassion
- Cultural Competency
- Crisis Management Skills
- Commitment to Medical Ethics
- Empathy
- Professionalism
- Perseverance
- Coping Skills
- Dedication
- Grit
- Stress Management Skills
- Healthy Self- Esteem
- Above Average GPA
- Psychological Flexibility
- Social Support
- Basic Science Undergraduate Curriculum
- Strong Writing Skills
- Shadowing Experience
- Test Preparation/Test Anxiety Mitigation Strategies
- Service and Social Mission Oriented

- Conflict Management Skills
- Research Experience

Based on the participant respondents a review process and an examination of the literature, the following themes were coded and developed. These themes were used to develop the model that will be discussed in Chapter 5:

Mental Health and Wellness Attributes

- Resilience
- Perseverance
- Coping Skills
- Dedication
- Grit
- Stress Management Skills
- Healthy Self- Esteem
- Psychological Flexibility
- Social Support

Pre-Medical Technical Attributes

- Above Average GPA
- Basic Science Undergraduate Curriculum
- Strong Writing Skills
- Shadowing Experience
- Test Preparation/Test Anxiety Mitigation Strategies
- Research Experience

Attributes for Maturity

- Service and Social Mission Oriented
- Conflict Management Skills
- Interpersonal Communication Skills
- Crisis Management Skills
- Commitment to Medical Ethics
- Compassion
- Cultural Competency
- Integrity
- Critical Thinking Skills
- Empathy
- Professionalism

Coding and Interrater Reliability

In addition to the survey, panelists were asked an open-ended question following round two. It is important to note that for the Delphi process, a limitation is that for responses that are open ended, there is not a standard mode for coding or consideration of these responses, especially in “identifying expertise” (Blease et al., 2021, p. 11). These responses were coded based on the themes provided for the model with discussion for future research and recommendations (see Chapter 5).

Research Questions

The first research question, as previously stated in Chapter 1 was examining the critical skills, core competencies and training necessary for a pre-professional education that will lead to successful medical school matriculation. The second research question, as previously stated in

Chapter 1 was if critical skills, core competencies and training be incorporated in a theoretical framework that supports pre-professional education for medical school. To address this research question, the 26 items that the panel of experts had reached consensus on will be coded to create a success model.

Chapter 5: Conclusions, Implications & Recommendations

Summary of the Study

The aim of this study was to assess, after analyzing the results from a panel of experts, which qualities and competencies are important for a successful medical school matriculation. In this chapter, a summary of the study is presented in addition to research question findings, additional items for considerations, implications of the study, recommendations for future research, and application of the findings.

The medical school admissions and selection process reveals requirements for admission and successful matriculation as academic achievement is underscored in addition to elements of the holistic review process (Duckworth, 2019; Ellinas & Ellinas, 2020; Epstein & Krasner, 2013). These elements of the holistic review process, echoed by the participants in this study, include grit (Blalock et al., 2015; Ellinas & Ellinas, 2020; Jumat et al., 2020; Majeed et al., 2019), resilience (Delany et al., 2015; Meyer et al., 2020; Stoffel & Cain, 2018) and perseverance (Duckworth, 2019). While academic achievement reached consensus in the study as far as a requirement for success, it is important to note that providing support to students through a post-baccalaureate program or other pre-professional program did not reach consensus in the study, but was a critical component in the literature (Andriole et al., 2015; Blakely & Broussard, 2003; Hacker & Schaefer, 1988; Jackson et al., 2003; McDougle et al., 2015). The panel of experts agreed on several key competencies that could be incorporated for pre-medical students without the structure of a formal pre-medical program or post-baccalaureate program.

Understanding how admissions committees for medical schools evaluate candidates sheds light on resources necessary for student success (Rospenda et al., 1994; Yamada et al., 2014) and can inform how institutions can better prepare and support students. As the necessary skills such as

resiliency, grit and integrity are evaluated (Rider & Keefer, 2006; Serwint & Rutherford, 2000; Stoeffel & Cain, 2018; Ursua et al., 2021), an assessment of technical attributes are considered based on medical specialty and graduate medical education (GME) (Jewett et al., 1982; Langewitz, et al, 1998; Rider & Keefer, 2006; Serwint & Rutherford, 2000). These necessary skills that are evident in the literature are also touted as critical in the study by the panel of experts. It is critical to examine the role and responsibilities of the admissions committee, the criteria they use in the selection process, and consider these elements to identify the role students and student success programs play in ensuring students are equipped with the appropriate tools (Blakely & Broussard, 2003; Epps, 2015).

The study examines criteria consistent in the research as it relates to voids in the pre-medical curriculum and considering facets of a candidate's application other than grade point average and MCAT (Loue et al., 2015; Pflipsen et al., 2021; Quince et al., 2014; Swick et al., 1999). The research is in alignment with the assessment of the perspective of a panel of experts as grade point average did not reach consensus in the second round and MCAT did not reach consensus after both round one and round two were complete. Some of the items on the survey high on the list of experts also reflect concepts consistent in research including integrity (Cox et al., 2014; de Leng et al., 2018; Erhard et al., 2017; Husbands et al., 2015; Jensen, 2009; Lemay et al., 2007), resilience (Howe et al., 2012; Keyes, 2005; Morales, 2014), test anxiety (Green et al., 2016; Paul et al., 2013; Powell, 2004), and grit (Duckworth, 2019; Ellinas & Ellinas, 2020; Jumat et al., 2020).

While traditionally medical school preparation begins with undergraduate programs, pre-health advisement, natural science clubs and organizations or pre-medical professional coursework, the research is consistent as some elementary schools have considered a curriculum in STEM (Grumbach & Chen, 2006), to robust pipeline programs (Jacob, 2015). Reviewing the

medical school curriculum and the history of academic medicine, it is critical to mention health disparities, health inequity, and barriers to medical care and education, specifically in underrepresented communities (Drake, 2014; Duff, 2011; Epps, 2015; Mullan, 2017; Savitt, 2006).

The research emphasizes the mission statements of medical schools pointing to research, social mission and certainly, in the midst of a pandemic, public health and health inequities as far as patient care (Baker, 2014; Baker et al., 2008; Campbell, 1997; Davis et al., 2007; Morphew & Hartley, 2006; Pearce & David, 1987). Considering medical school mission, priorities involve physicians that elect to practice primary care, social responsibility and serving populations that are considered medically underserved (Morley et al., 2015; Mullan, 2017). Important to consider are also issues of access to healthcare and the need for physicians to reflect the patient diversity present, inclusive of gender, sexual orientation, language and culture.

Research Question Findings

Two research questions were considered throughout this study:

1. What are the critical skills, core competencies and training necessary for a pre-professional education that will lead to successful medical school matriculation?
2. Can these critical skills, core competencies and training be incorporated in a theoretical framework that supports pre-professional education for medical school?

Examining the top competencies from the panel of experts, the participants found that resilience and integrity had the highest level of consensus and a lowest IQR among the items. These two items shape the conversation surrounding these research questions as it is critical to examine if they can be taught or incorporated in a framework.

Integrity

In research on morality and ethics, when defining integrity, some researchers use the very opposite of this trait as the best way to define integrity; essentially, to define integrity is to define what it is not (Cox et al., 2014). McFall (1987) described integrity as aligning with “conventional standards of morality” and affiliates integrity with telling the truth, being honest and practicing fairness (p. 5). Jensen (2009) differentiated among ethics, morality and integrity defining integrity as “honoring your word” (p. 16). Additionally, Erhard et al. (2017) asserted that while morality, ethics and legality are about “good and bad” or “right or wrong”, integrity is objective and aligns with the highest performance for an organization or an individual leading to completeness in life quality and personhood (p. 12). In alignment with this study, Banks and Gallagher (2008) considered implications of integrity and ethics in the life of a professional in healthcare, social and public service. The authors indicated that integrity can refer to behavior that is honest and able to be trusted. Hurst et al. (2015) examined the ethical dilemmas faced by physicians on a day to day basis but disclose that many do not consult advisors for how to address the ethical dilemmas

This is consistent in the research as far as competencies for medical school preparedness and has even led to various methods of measuring integrity in the medical school selection process (de Leng et al., 2018; Husbands et al., 2015; Lemay et al., 2007). Some institutions use hypothetical judgment questions to assess who a student would respond in a particular scenario (Husbands et al., 2015) and others use the Multiple Mini Interview (MMI) questions (Cleland et al., 2020; Gale et al., 2016; Eva et al., 2004; Lemay et al., 2007; Pau et al., 2013; Sebok et al., 2014; Yen et al., 2011). Other institutions, instead of incorporating an instrument that measures integrity during the interview process, requires that an assessment like CASper is taken before an admissions decision is rendered (Dore et al., 2017; Yingling et al., 2018; Shipeolu et al., 2021). It

is critical that the importance of integrity is instilled early in the application process and its importance is reinforced when the student is admitted and matriculates. Davis et al. (2007) asserted that if a character trait is considered important it affects the outcome of the student.

Resilience

Corresponding with the panel of experts, resilience is an important attribute in the literature as far as a critical skill for students to possess (Burgis-Kasthala et al., 2019; Haglund et al., 2009; Howe et al., 2012; Keyes, 2005; Morales, 2014). Burgis-Kasthala et al. (2019) connected resilience with the ability to improve stress and academic performance and Howe et al. (2012) cited resilience as critical to succeeding in spite of failure or setback. The literature is clear on the definition of resilience and considers this strength specific to academic resilience, also referred to in the literature as academic buoyancy (Martin & Marsh, 2008), and emotional resilience (Grant & Kinman, 2014; Jokinen, 2005).

In an international study of medical students and academic resilience, Hayat et al. (2021) defined academic resilience as a method of gauging a student's response to setbacks that may derive from academic stress. Martin and Marsh (2008) and Putwain et al. (2012) considered the term academic buoyancy when students are able to have positive and productive reactions despite challenges faced in an educational environment. Grant and Kinman (2014) defined *emotional resilience* as the ability to “recover from adversity, react appropriately, or bounce back when life presents challenges” (p. 25). Jokinen (2005) examined leadership competencies and rates emotional resilience as a key trait for global leaders and Grant and Kinman (2014) agreed that it is a beneficial trait to possess for those that employed in the “helping professions” (p. 24).

Teaching Resilience and Integrity

Considering the second research question, prevalent in the research is if integrity and resilience can be incorporated in a format to teach health professions students (Coverdale et al., 2016; Dudzinski, 2004; Eby et al., 2013; Klemenc-Ketis and Kersnik, 2011) but for the purpose of this study, we consider if these items can be taught and incorporated in a pre-medical framework. Some admissions committees use elements of the application process to assess resilience, like the content of the essay, letters of recommendation and any information the student may self-disclose. As far as integrity, this can also be measured assessing any infractions or instances of academic dishonesty on a candidate's application.

Klemenc-Ketis and Kersnik (2011) provided the example of using film to shed light on a *hidden curriculum* and teach them professionalism. Blumer (2010) discussed the concept of the instructional delivery model of "cinemeducation" (p. 225) and Russell (2012) explained that teaching with film as strategy can be expanded into five ways of teaching film:

1. "visual textbook"
2. "depicter of atmosphere"
3. "analogy"
4. "historiography"
5. "springboard" (p. 157)

These methods correspond with Klemenc-Ketis and Kersnik's (2011) assertion of film as an art form that permits students to consider healthcare from a "bio-psycho-social-spiritual" approach, teaching them compassionate patient care and skills in communication, "breaking bad news, ethical issues and family dynamics" (p. 4).

We have discussed, emotional resilience (Jokinen, 2005) and academic resilience, (Hayat et al., 2021; Morales, 2014), yet teaching resilience in the literature places specific emphasis on providing students with resources to overcome hardship, difficulty, and challenges (Bird et al., 2020; Lin, 2019; Outram & Kelly, 2014; Wright & Richmond Mynett, 2019). For resilience, the literature references academic resilience with an emphasis on motivation (Gregg, 2013), teaching students to persevere and not give up during academic challenges or difficulty. Resilience can also be viewed through a socio-cultural lens as Deming (2020) described challenges underrepresented groups face in a pre-medical program.

Additional Items for Consideration

During the second round of the Delphi analysis, participants were also asked if there were other items that may have been beneficial to the study. One participant inquired about above average grade point average as an item that could be considered for students that considered themselves disadvantaged and students that were “mainstream.” This coincides with the research on pre-professional programs for students from disadvantaged backgrounds (Blakely & Broussard, 2003; Smitherman et al., 2021). This research makes a correlation between grade point average and being disadvantaged in addition to correlations between being underrepresented and being disadvantaged. What are the considerations for students that are disadvantaged and have a high-grade point average? What about students that are underrepresented in medicine but are not disadvantaged? Warne et al. (2014) examined grade point averages from high school among students in an undergraduate pre-medical program and paid close attention to students that were from diverse groups and from backgrounds that reflected a low socio-economic status. This study makes predictions based on MCAT, high school weighted and unweighted grade point average, and college grade point average concluding that because of the discrepancy among various high

schools, it is more accurate unweighted high school grade point average to predict if students would become medical school graduates. For some admissions committees, the review of academic achievement is including but not limited to grade point average, rigor of academic program and/or strength of curriculum and reputation of the institution (Cohen-Schotanus et al., 2006; Patrick et al., 2001; Warne et al., 2014; Wilkinson et al., 2008).

Empathy and Compassion

Another quality that was recommended to examine was empathy. Related terms (Patel et al., 2019; Reiss, 2017), compassion is described as relating to the pain of someone else while empathy is considered the ability to recognize others emotions, discern the differences between their emotions and ours, to acknowledge their perspective. Both are considered key competencies in the literature (Branch, 2000; Decety, 2020; Hegazi & Wilson, 2013; Patel et al., 2019; Reiss, 2017) and relate to the concept of morality, maturity and student development. Krishnasamy et al., 2019 considered the difference between the two terms specifically in medical education as empathy as the ability to comprehend the pain or suffering of a patient and compassion as taking empathy a step further, leading to the desire to ease or assuage said suffering. Our study focused on compassion as a key competency, marrying the understanding of suffering with the maturity and the care to want to use the necessary skills to diagnose and treat.

Pre-Professional Program vs. Pre-Health Guidance

Another consideration in the comments from the experts relates to access to pre-professional programs and if students have access to these services, if they actually use them. This study focused on pre-professional competencies and as pre-professional program participation was an item that did not reach consensus, the broader consideration is examining if students have access to any pre-professional resources, including but not limited to, programs, workshops,

advisement, standardized test preparation, mentoring and/or shadowing opportunities. While pre-professional program participation has been shown to be beneficial in exposing students to the medical profession (Blakely & Broussard, 2003; Holden et al, 2014), it should not be limited to a structured program but should be all-encompassing to include resources, even if delivered in an individualized format.

Implications of the Study

As we consider the implications of the study, it is critical to begin with the items that did not reach consensus and examining these items against the literature. Of the items that reached consensus, three did not reach consensus:

- Religion/Spirituality
- Above Average MCAT Score
- Pre-Professional Program Participation

Religion/Spirituality

Religion/Spirituality did not reach consensus in this study, but in the literature on grit and resilience, this item surfaced as a coping method in attempting to build resiliency (Park et al., 2015; Thompson et al., 2016). In a study measuring resilience and coping strategies, Thompson et al. (2016) found that in addition to increased physical fitness and social support from family, students found solace in “support from a church or spiritual advisor” (p. 180). Estupiñan and Kibble (2018) drew parallels between burnout and spirituality citing, in a study examining students in a medical school located in the southeast region of the United States, that spirituality led to students being more effective in their profession. The authors indicate the following as “sources of student support” (p. 37):

- Family and friends

- Connecting to God or a higher power
- Membership in a spiritual or religious community
- Meditating/Prayer
- Listening to music
- Spending time outdoors

Above Average MCAT Score

Of the three items that did not reach consensus, one in particular, above average MCAT score, has been pervasive in the literature as it relates to predictive validity (Dunleavy et al., 2013; Gauer et al., 2016; Gauer & Jackson, 2017). Predictive validity in medical school admissions uses the MCAT exam to predict how students will perform on future USMLE Exams, especially Step 1 which measures the ability to apply basic science knowledge from the classroom to practicing medicine (Sherva, 2002; Swygert et al, 2004). In alignment with the panel of experts, Terrigino et al. (2020) found that MCAT did not always predict student success. Especially in the past 3 years as many institutions contemplated a “test optional” route due to COVID-19 and closing examination centers (Corridon, 2021; Michalec, 2020) many institutions had to use other methods of assessing students and predicting performance.

Pre-Professional Program Participation

In this study, we make the delineation between pre-professional competencies necessary before medical school and the actual structure of a pre-professional program, this was still a surprise as the research supports pre-professional programs in the form of workshops, post-baccalaureate programs, and summer enrichment programs (Blakely & Broussard, 2003; Jackson et al., 2003; McDougale et al., 2015). As discussed, many pre-professional programs guarantee students special admission pending a set of admissions committee-mandated requirements while

others aimed to increase the number of underrepresented students (Alsan & Wanamaker, 2018; Crenner, 2012; Jackson et al., 2003; Savitt, 2006).

While there is not necessary a correlation among the three items that did not reach consensus, it provides a critical framework when we consider “best fit” in the medical admissions process. These items that did not reach consensus, and the supporting research, may aid medical school admissions committees in identifying the best candidates for their programs, and if elements such as Above Average MCAT score are a part of the review process, this study may provide some context for reevaluating this requirement.

Recommendation for Future Research

Future research would involve expanding the study on a national or international level involving a comparative analysis of key competencies based on the perspective of experts from the following:

- Private institutions vs. Public institutions
- Competencies based on medical specialty
- Competencies comparatively based on country

Do experts agree on medical competencies from a global perspective or do they differ depending on country or other cultural competencies? Do medical school experts at private liberal arts colleges differ in the competencies they would prioritize in comparison to experts in the medical field from large universities? A consideration also involves students that are outliers. There were items on the survey that did not reach consensus. Resilience and grit were among the items that reached consensus in addition to above average MCAT and above average grade point average.

Could additional research be conducted on students that did not have any of the items that reached consensus but still found success in the medical school to graduate medical education process?

Additionally, as the research references resilience and grit as two separate concepts (Duckworth, 2019; Haglund et al., 2009; Howe et al., 2012; Kjeldstadli et al., 2006; Meyer et al., 2020; Stoffel & Cain, 2018), the panel of experts also made a clear distinction between the two, valuing resilience above grit. As Burgis-Kasthala et al. (2019) and Haglund et al. (2009) connected, stress management, grit and resilience, Howe et al. (2012) defined resilience as the ability for individuals to succeed in spite of challenges. The authors list the following items and elements of resilience:

- Self-efficacy
- Self-control
- Engaging support
- Engaging help
- Learning from difficult situations
- Persistence in spite of impediments to progress

These elements are consistent with the rater's perspective necessary elements for success including coping skills, crisis management skills, stress management skills and perseverance.

Application of the Findings

After a review of the results from the experts, it was necessary to develop a model with dedicated themes for pre-medical education. This model will shape the pre-health profession process and allow students to focus on critical elements that will lead to success.

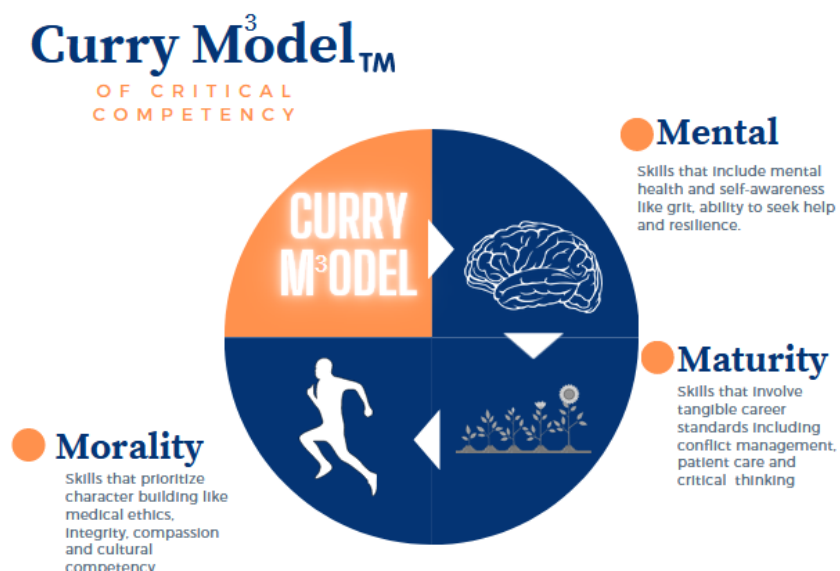
The Curry Model for Pre-Medical Education involves three key tenants: Mental Health and Wellness (Mental), Character Building (Motivation), and Critical Skills for Physicians (Maturity). Mental health for medical students, residents and physicians is critical. From medical student

imposter syndrome (Mullangi & Jagsi, 2019; Russell, 2017) to increased depression and suicidal ideation (Caceres & Lizotte-Waniewski, 2021; Dyrbye et al., 2008; Juamt et al., 2020; Majeed et al., 2019; Thuma et al., 2020; Voltmer et al., 2021), the trend of mental health issues increases through graduate medical education and licensure. From practicing mindfulness (Warnecke et al., 2011) to developing coping curricula (Moffat et al., 2004), to identifying instruments for measuring stress (O'Rourke et al., 2010), prevalent in the literature are interventions and mitigation strategies to address pre-medical student stress, coping strategies and resources for student services and support.

Residents (Gelfand et al., 2004; Chaukos et al., 2017; Ripp et al., 2010) and physicians (Chopra et al., 2004; Patel et al., 2019; West et al., 2018) experience burnout which affects their own wellness, performance and health and even their perception of their patients (Baer et al., 2017).

Figure 3

The Curry Model of Critical Competency



Academic achievement is considered a technical skill in this model. While academic excellence is paramount, it is not narrowly defined by a grading scale, grade point average or standardized test score. It is, however, measured based on grade trajectory, motivation, knowing when to seek academic support and grit, which is defined as the application of maintained perseverance toward a goal or expected end (Jumat et al., 2020)

Summary

The literature supports this study's findings and the results from the panel of experts. A key component of the panelist's findings involved resilience and support services for students. While this initial study was nationwide and included experts on medical students, medical school admissions and critical skills and competencies necessary for success, the study's sample size was small. With unlimited resources, the findings could be used to conduct a more expansive national or international survey that encompassed perspectives from experts at different stages in the process including pre-professional undergraduates, health professions advisors, medical residents, and current medical students. Drawing from the research on resilience, academic resilience and emotional resilience, a more specific study on resilience and its long term effects on pre-medical students, medical students and eventual medical residents would add the research on best practices on how to provide students with socio-emotional support. A Delphi study would still be ideal, but findings from this study suggest the opportunity to establish elementary school, middle school, high school, summer/weekend and undergraduate pipeline programs for medical school hopefuls, particularly those from underrepresented environments. As many pipeline programs focus on challenges unique to first generation college students (Strayhorn, 2011), specifically those in STEM (Harackiewicz et al, 2014), first generation professional students (Doerschuk et al, 2016; Gardner & Holley, 2011; Holley & Gardner, 2012), first generation medical students (Allen et al.,

2015; Boakye-Ansa et al., 2021) and underrepresented minorities in medicine, in an effort to acclimate first generation college students to pre-professional programs (DiMola & Lowe, 2017; Romero et al., 2020) and campus life, I would like to design programs that prepare students academically for medical school but also acknowledging other barriers to success as indicated in the study.

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APPENDIX A

Sample Recruitment Script

**Sample Recruitment Script Template**

Dear [Name],

My name is April Curry I am a doctoral student in the Graduate School of Education and Psychology at Pepperdine University. I am conducting a research study examining the necessary training for successful medical students, examining the components of a pre-professional medical program and to determine if pre-professional programs have the ability to address or enhance any gaps in learning and you are invited to participate in the study.

If you agree, you are invited to participate by completing a survey over the course of 3 distinct cycles that will involve submitting survey responses on medical school preparedness. The survey is anticipated to take no more than 30 minutes for each cycle. Participation in this study is voluntary. Your identity as a participant will remain confidential during and after the study. Confidentiality will be maintained using a series of security measures, including password protected email communication using university firewall protections, deidentification of data using pseudonyms as well as compartmentalization of the various data elements, keeping all information separate. If you have questions or would like to participate, please contact me at (email address).

Thank you for your participation,

April Curry

Pepperdine University| Graduate School of Education and Psychology

Doctoral Candidate

Sample Questionnaire

[illegible]

Research Experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthy Self-Esteem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Basic Science Undergraduate Curriculum	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong Writing Skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Shadowing Experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dedication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<https://form.jotform.com/220215825481148>

Additional comments

Submit

APPENDIX C

Sample Informed Consent Form



IRB TEMPLATE SOCIAL- BEHAVIORAL ADULT PARTICIPANT INFORMED CONSENT

IRB #: TBD**Formal Study Title: Preparing for Professional Programs Strategies and Practices for Pre-Medical Education****Authorized Study Personnel:**

Principal Investigator: April Curry

100556470

April.curryroberts@pepperdine.edu

Key Information:**If you agree to participate in this study, the project will involve:**

- ☒ (Females and Males) between the ages of (18-90)
- ☒ Procedures will include the following: making contact with the participants using the recruitment script, informed consent form, data collection through the questionnaire, analysis of the data, and documentation of findings)
- ☒ The completion of the questionnaire three times.
- ☒ The total time commitment of 90 minutes (30 minutes for each cycle).
- ☒ There is minimal risk associated with this study
- ☒ You will be paid in the form of an electronic gift card for your participation
- ☒ You will be provided a copy of this consent form

Invitation

You are invited to take part in this research study. The information in this form is meant to help you decide whether or not to participate. If you have any questions, please ask.

Why are you being asked to be in this research study?

You are being asked to be in this study because you have been identified as a leader in the field of medicine. You must be 18 years of age or older to participate.

What is the reason for doing this research study?

The purpose of this study is to determine the necessary training for successful medical students, examining the components of a pre-professional medical program, and to determine if pre-professional programs have the ability to address or enhance any gaps in learning.

What will be done during this research study?

You will be asked to complete a questionnaire for a total of three cycles. Each cycle will take approximately 30 minutes to complete. You will be asked a series of questions aimed at figuring out how industry experts perceive certain behaviors. While the research will take approximately 26 to 52 weeks, your participation will only take 90 minutes over the course of several weeks.

How will my data be used?

Your questionnaire responses will be analyzed and aggregated in order to determine the findings to the established research questions.

What are the possible risks of being in this research study?

This research presents minimal risk of loss of confidentiality, emotional and/or psychological distress because the questionnaire involves questions about your leadership practices. You may also experience fatigue, boredom, restlessness or anxiety as a result.

What are the possible benefits to you?

You are not expected to get any benefit from being in this study.

What are the possible benefits to other people?

The benefits to society may include better understanding of leadership strategies used within the medical field. Other emerging leaders might also benefit from any additional recommendations that are shared through this process.

What are the alternatives to being in this research study?

Participation in this study is voluntary. There are no alternatives to participating, other than deciding to not participate.

What will participating in this research study cost you?

There is no cost to you to be in this research study.

Will you be compensated for being in this research study?

You will be paid in the form of an electronic gift card for your participation.

What should you do if you have a problem during this research study?

Your welfare is the major concern of every member of the research team. If you have a problem as a direct result of being in this study, you should immediately contact one of the people listed at the beginning of this consent form.

How will information about you be protected?

Reasonable steps will be taken to protect your privacy and the confidentiality of your study data. The data will be deidentified and stored electronically through a secure server and will only be seen by the research team during the study and until the study is complete.

The only persons who will have access to your research records are the study personnel, the Institutional Review Board (IRB), and any other person, agency, or sponsor as required by law. The information from this study may be published in scientific journals or presented at scientific meetings but the data will be reported as group or summarized data and your identity will be kept strictly confidential.

What are your rights as a research subject?

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study.

For study related questions, please contact the investigator(s) listed at the beginning of this form.

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB):

Phone: 1(310)568-2305

Email: gpsirb@pepperdine.edu

What will happen if you decide not to be in this research study or decide to stop participating once you start?

You can decide not to be in this research study, or you can stop being in this research study (“withdraw”) at any time before, during, or after the research begins for any reason. Deciding not to be in this research study or deciding to withdraw will not affect your relationship with the investigator or with Pepperdine University.

You will not lose any benefits to which you are entitled.

Documentation of informed consent

You are voluntarily making a decision whether or not to be in this research study. Signing this form means that (1) you have read and understood this consent form, (2) you have had the consent form explained to you, (3) you have had your questions answered and (4) you have decided to be in the research study. You will be given a copy of this consent form to keep.

Participant

Name:

(First, Last: Please Print)

Participant

Signature:

Signature

Date

APPENDIX D

GSEP IRB Approval Notice

Pepperdine University
24255 Pacific Coast Highway
Malibu, CA 90263
TEL: 310-506-4000

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: February 14, 2022

Protocol Investigator Name: April Curry Roberts

Protocol #: 21-10-1699

Project Title: Preparing for Professional Programs: Strategies and Practices for Pre-Medical Education

School: Graduate School of Education and Psychology

Dear April Curry Roberts:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chair

cc: Mrs. Katy Carr, Assistant Provost for Research